National Income Theory

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1 INTRODUCTION
导论

Economic change, like other kinds of social change, consists of a welter of detailed movements containing certain major overall tendencies.
经济变革，像其他类型的社会变革一样，由包含某些主要总体趋势的纷繁复杂的细节变动组成。

Some industries spring up and expand while others decay; some geographical areas enjoy rapid growth and improvement while others stagnate; some individuals and groups enjoy rapid improvement in their material well-being while others do not.
一些行业如雨后春笋般涌现并扩张，而另一些则衰退；一些地理区域享有快速的增长和改善，而另一些则停滞不前；一些个人和群体的物质福利得到迅速改善，而另一些则不然。

Sometimes nearly everyone and nearly every industry and area enjoy relatively prosperous times; other times nearly everyone and nearly every industry and area suffer relatively hard times.
有时，几乎每个人、每个行业和每个地区都享受着相对繁荣的时期；而有时，几乎每个人、每个行业和每个地区都遭受着相对艰难的时期。

Some changes are brief and predictable, such as the annual pre-Christmas rush, or brief and unpredictable, such as the disruption caused by a heavy snowstorm.
有些变化是短暂且可预测的，例如每年圣诞节前的抢购潮；或者是短暂且不可预测的，例如暴风雪造成的破坏。

Some are gradual and fairly predictable, such as the growth of cities and their outlying suburbs; some are gradual and unpredictable, such as changes in the architectural style of new buildings.
有些变化是渐进且相当可预测的，例如城市及其边远郊区的增长；有些是渐进且不可预测的，例如新建筑建筑风格的变化。

The more predictable changes usually receive comparatively little attention in economic analysis, because they can be taken for granted; the least predictable ones may also receive little attention if there is little hope of improving our understanding of them.
在经济分析中，更可预测的变化通常受到的关注相对较少，因为它们被认为是理所当然的；最不可预测的变化也可能受到很少的关注，如果我们对其理解的改进希望渺茫的话。

The same is generally true of the most brief and of the most gradual changes.
对于最短暂和最渐进的变化，情况通常也是如此。

Broadly speaking, the most interesting changes are neither very brief nor very gradual, but in between.
广义地说，最有趣的变化既不是非常短暂的，也不是非常渐进的，而是介于两者之间。

Naturally enough, those changes are most interesting that affect nearly everyone.
很自然地，那些影响几乎所有人的变化是最有趣的。

Finally, those changes are most interesting which seem to have some system or repetition to them, so that even if only imperfectly predictable, they offer hope of significant improvements in our understanding and ability to predict.
最后，那些似乎具有某种系统性或重复性的变化是最有趣的，因此即使只能不完美地预测，它们也为显著提高我们的理解和预测能力带来了希望。

The economic changes that most completely fit these specifications are the movements of national income, production, employment, and prices known as recession or depression, recovery, boom, and inflation.
最完全符合这些规格的经济变化是国民收入、生产、就业和价格的变动，即所谓的衰退或萧条、复苏、繁荣和通货膨胀。

Such movements extend anywhere from several months to several years.
这种变动持续的时间从几个月到几年不等。

They affect people throughout the community in ways that are obvious and important.
它们以明显且重要的方式影响着整个社会的人们。

While each such movement is different from every other such movement, as a whole they exhibit characteristic patterns and relationships that seem to be repeated.
虽然每一次这样的变动都与其他变动不同，但作为一个整体，它们表现出似乎在重复的特征模式和关系。

These patterns and relationships lack the reliability that would enable us to predict the movements in question, but they are good enough to offer a definite challenge and a hope that accurate prediction and counteraction will be possible.
这些模式和关系缺乏能让我们预测相关变动的可靠性，但它们足以提出明确的挑战，并带来一种希望，即准确的预测和反制措施是可能的。

Consequently, they have been the subject of profound speculation and controversy for generations and in various respects continue to be.
因此，它们世世代代都是深刻推测和争议的主题，并且在各个方面继续如此。

Although many issues, some theoretical and some practical, remain unsettled, the keen discussion of all aspects of economic fluctuations in the last several decades has brought greater clarity and system into their analysis.
尽管许多问题（有些是理论上的，有些是实践上的）仍未解决，但过去几十年对经济波动各个方面的热烈讨论已使其分析变得更加清晰和系统。

The greatest impetus toward clarity and system came from J. M. Keynes's *The General Theory of Employment Interest and Money*, even though, or perhaps especially because, it left something to be desired in both respects.

这种追求清晰和系统的最大推动力来自 J. M. 凯恩斯的《就业、利息和货币通论》，尽管（或者也许正因为）它在这两个方面都有所欠缺。

The most important consequence of the publication of *The General Theory* has been the development of a single, straightforward, widely understood approach to macroeconomics, the main elements of which that work contained.
出版《通论》最重要的后果是发展出了一种单一、直接、被广泛理解的宏观经济学方法，该著作包含了这种方法的主要要素。

The review and elaboration of this type of approach are a principal task of the present work.
回顾和阐述这种方法是本书的一项主要任务。

Macroeconomics considers the ways that decisions by one group or sector interact with the decisions of other groups or sectors to produce an overall level and composition of national income.
宏观经济学考察的是一个群体或部门的决策如何与其他群体或部门的决策相互作用，从而产生国民收入的总体水平和构成。

This stands in contrast to the theory of the firm and the theory of consumer behavior, in which the rest of the economy and its major variables are taken as given, unaffected by the actions of the firm or consumer.
这与厂商理论和消费者行为理论形成对比，在后两者中，经济的其余部分及其主要变量被视为既定的，不受厂商或消费者行为的影响。

Although our analysis will draw on some aspects of these theories, its concerns are generally of a different, more comprehensive kind.
尽管我们的分析将借鉴这些理论的某些方面，但它关注的通常是另一种不同的、更全面的问题。

Many of the topics and problems we shall consider are primarily theoretical and academic in nature while some have extensive practical implications.
我们将要考虑的许多话题和问题本质上主要是理论性和学术性的，而有些则具有广泛的实际意义。

The interrelationships between the two types of problems are so great, however, that for the most part we shall make no attempt to separate them.
然而，这两类问题之间的相互关系是如此密切，以至于在大多数情况下，我们将不尝试将它们区分开来。

2 ELEMENTS OF NATIONAL INCOME THEORY
国民收入理论要素

2.1 PROCEDURE
程序

First we shall review the most important features of the theory of national income determination.
首先，我们将回顾国民收入决定理论最重要的特征。

This theory uses simplified, partly illustrative assumptions about economic behavior that permit key ideas to stand out.
该理论使用了关于经济行为的简化假设，部分是为了说明问题，从而使关键思想得以突显。

Some aspects of the mutual dependence of households and firms are easy to grasp and are also very important.
家庭和企业相互依赖的某些方面很容易掌握，同时也非常重要。

As we proceed through a series of assumptions and their consequences, we shall build up a model of the whole economy.
随着我们通过一系列假设及其后果进行推导，我们将建立一个整个经济的模型。

This model, even though starkly simplified, reveals dominant relationships among the main economic aggregates.
这个模型虽然极其简化，但揭示了主要经济总量之间的主导关系。

We can then consider more detailed and complex relationships among these aggregates.
然后，我们可以考虑这些总量之间更详细和复杂的关系。

The term *income* refers to the total money value of the flow of net incomes of households.
术语"收入"指的是家庭净收入流的总货币价值。

Changes in its size reflect both changes in tangible standards of living and changes in the general level of prices.
其规模的变化既反映了有形生活水平的变化，也反映了总体价格水平的变化。

Changes in income with no change in the general price level, or with nonproportional changes in the general price level, are referred to as changes in real income.
在总体价格水平不变的情况下，或在总体价格水平发生非比例变化的情况下的收入变化，被称为实际收入的变化。

Since our immediate concern is with changes in real income, we begin by assuming that the general price level is constant.
由于我们要立即关注的是实际收入的变化，我们首先假设总体价格水平是恒定的。

2.2   A FIRST MODEL OF INCOME DETERMINATION
第一个收入决定模型

We begin with the relationship between aggregate consumption and aggregate income: when income increases, consumption does also.
我们从总消费和总收入之间的关系开始：当收入增加时，消费也会增加。

We shall use the simplest reasonable assumption: consumption is a linear function of income. That is, we have
我们将使用最合理的简单假设：消费是收入的线性函数。也就是说，我们有

$$C = A + bY \tag{1}$$

where A and b are constants.
其中 A 和 b 是常数。

Moreover we shall assume that investment is a fixed quantity, say I_1.
此外，我们将假设投资是一个固定量，设为 I_1。

Current income consists exactly of claims to current production, made up of consumption and investment, so we write
当期收入完全由对当期生产的索取权构成，这些生产由消费和投资组成，所以我们写道

$$Y = C + I_1 \tag{2}$$

Equation (1) shows how fast the nation's households think it prudent to absorb consumption goods as a function of their current incomes.
方程 (1) 表明了作为一个国家家庭当前收入的函数，他们认为以多快的速度吸收（购买）消费品是审慎的。

Equation (2) is an accounting expression stating that the total of all incomes equals the sum of those arising in the production of consumption goods and those arising in the production of investment goods.
方程 (2) 是一个会计表达式，说明所有收入的总和等于生产消费品产生的收入与生产投资品产生的收入之和。

I_1 is given, but consumption and income are not—they can take on a whole range of pairs of values and remain consistent with either of the equations (1) and (2) taken separately.
I_1 是既定的，但消费和收入不是——它们可以取一系列的数值对，并且与方程 (1) 和 (2) 中的任何一个单独保持一致。

However, only one pair of values (viz., one value of consumption combined with one value of income) is consistent with both equations at the same time, whenever $b \neq 1$.
然而，只要 $b \neq 1$，只有一对数值（即，一个消费值结合一个收入值）同时与两个方程保持一致。

That is, we have two linear equations in two unknowns, and they determine one value for each.
也就是说，我们有两个未知数的两个线性方程，它们分别为每个未知数确定一个值。

If we substitute the right-hand side of (1) for the variable C in (2), we obtain
如果我们用 (1) 式的右边代替 (2) 式中的变量 C，我们得到

$$Y = A + bY + I_1 \tag{3}$$

from which we get the solution
从中我们得到解

$$Y_1 = \frac{A + I_1}{1 - b} \tag{4}$$

provided the constant b is not equal to 1.
前提是常数 b 不等于 1。

One can also obtain the solution value of C, that is, the value of C that is consistent with both equations (1) and (2), by substituting the solution for Y into equation (1) or equation (2).
人们还可以通过将 Y 的解代入方程 (1) 或方程 (2) 来获得 C 的解值，即与方程 (1) 和 (2) 都一致的 C 值。

With consumption a linear function of income and with investment given, we have obtained a single determinate value of income.
在消费是收入的线性函数且投资既定的情况下，我们获得了一个单一的确定的收入值。

For some other given value of investment, a different value of income would result.
对于其他某个既定的投资值，将会产生不同的收入值。

That is, if investment equals I_2 instead of I_1, income will be
也就是说，如果投资等于 I_2 而不是 I_1，收入将会是

$$Y_2 = \frac{A + I_2}{1 - b} \tag{5}$$

Wherever consumption behaves as in equation (1) and our other simplifications fit the facts well, we can say that income rises and falls with investment.
只要消费行为符合方程 (1) 且我们的其他简化假设与事实吻合，我们就可以说收入随投资的涨跌而涨跌。

Indeed, we can even predict the size of the change in income, when investment changes, if we know the constant b. Subtracting (4) from (5), we have
实际上，如果我们知道常数 b，当投资发生变化时，我们甚至可以预测收入变化的幅度。用 (5) 减去 (4)，我们得到

$$Y_2 - Y_1 = \frac{A + I_2}{1 - b} - \frac{A + I_1}{1 - b}$$
$$= \frac{I_2 - I_1}{1 - b} \tag{6}$$

That is, when investment changes by an amount $\Delta I = I_2 - I_1$, the change in income will be
也就是说，当投资变化量为 $\Delta I = I_2 - I_1$ 时，收入的变化将是

$$\Delta Y = Y_2 - Y_1$$
$$= \frac{\Delta I}{1 - b} \tag{7}$$
$$= k\Delta I$$

The constant k represents the expression $1/(1 - b)$.
常数 k 代表表达式 $1/(1 - b)$。

The only relevant assumption is that the constant b, the marginal propensity to consume, is a positive fraction. That is,
唯一相关的假设是常数 b，即边际消费倾向，是一个正分数。也就是说，

$$0 < b < 1 \tag{8}$$

The reciprocal of a fraction is a number greater than 1; therefore k, in equation (7), is greater than 1.
一个（真）分数的倒数是一个大于 1 的数；因此方程 (7) 中的 k 大于 1。

If b is close to 1, $1 - b$ is nearly zero and its reciprocal k will be a large number; if b is nearly zero, $1 - b$ is almost 1 and its reciprocal is only slightly greater than 1.
如果 b 接近 1，则 $1 - b$ 接近零，其倒数 k 将是一个很大的数；如果 b 接近零，则 $1 - b$ 几乎为 1，其倒数仅略大于 1。

That is, k varies directly with b.
也就是说，k 随 b 同向变化。

Since k is greater than 1, a change in income as indicated in equation (7) is larger than (loosely speaking, is a multiple of) the change in investment that caused it. Hence k is called the *multiplier*.
由于 k 大于 1，如方程 (7) 所示的收入变化大于（通俗地说，是倍数于）引起该变化的投资变化。因此 k 被称为**乘数**。

The multiplier can be derived by a different procedure, which some find helpful for getting a better grasp of the income model.
乘数可以通过另一种程序推导出来，有些人觉得这有助于更好地掌握收入模型。

First we note that whenever current income increases by some amount, say $\Delta_1 Y$, there will be a corresponding increase in consumption $\Delta_1 C$.
首先我们注意到，每当当前收入增加一定量，比如说 $\Delta_1 Y$，消费也会有相应的增加 $\Delta_1 C$。

Proceeding as in the derivation of equation (7) but using equation (1) alone, we find that
按照推导方程 (7) 的方式进行，但仅使用方程 (1)，我们发现

$$\Delta_1 C = b\Delta_1 Y$$

Further, producing consumption goods to satisfy this additional consumer demand will itself generate additional income.
此外，生产消费品以满足这一额外的消费者需求，其本身也会产生额外的收入。

If we start with an increase in investment ΔI, this gives us the first increase in income $\Delta_1 Y$.
如果我们从投资增加 ΔI 开始，这给了我们要第一个收入增加量 $\Delta_1 Y$。

There will follow an increase in consumption $\Delta_1 C$.
随后将出现消费的增加 $\Delta_1 C$。

This implies, as just noted, a second increase in income $\Delta_2 Y$ equal to $\Delta_1 C$.
正如刚才指出的，这意味着收入的第二次增加 $\Delta_2 Y$ 等于 $\Delta_1 C$。

This second rise in income will cause a further increase in consumption, which itself will generate income, which will imply yet another increase in consumption, and so on indefinitely.
这第二次收入增加将引起消费的进一步增加，这本身又会产生收入，从而意味着消费的再一次增加，如此无限循环下去。

Just as the first increase in consumption is equal to b times the first increase in income, the second increase in consumption is equal to b times the second increase in income
正如第一次消费增加等于 b 乘以第一次收入增加，第二次消费增加等于 b 乘以第二次收入增加

$$\begin{aligned}
\Delta_2 C &= b(\Delta_2 Y) \\
&= b(\Delta_1 C) \\
&= b(b\Delta_1 Y) \\
&= b^2 \Delta_1 Y \\
&= b^2 \Delta I
\end{aligned}$$

and can thus be reduced to an expression in ΔI. In the same way,
因此可以简化为关于 ΔI 的表达式。同样地，

$$\Delta_3 C = b\Delta_2 C = b^3 \Delta I$$

and so on; after j repetitions we have
以此类推；经过 j 次重复后我们有

$$\Delta_j C = b^j \Delta I$$

where $j = 1, 2, 3, 4, \ldots$.
其中 $j = 1, 2, 3, 4, \ldots$。

Now we can obtain the total change in income that results from ΔI by summing all the changes in income contributed by these successive steps
现在我们可以通过将这些连续步骤贡献的所有收入变化相加，来获得由 ΔI 引起的总收入变化

$$\Delta Y = \Delta_1 Y + \Delta_2 Y + \Delta_3 Y + \cdots + \Delta_j Y + \ldots$$

where the sequence on the right continues indefinitely. Since
其中右边的序列无限延续。由于

$$\Delta_1 Y = \Delta I$$
$$\Delta_2 Y = \Delta_1 C = b\Delta I$$
$$\Delta_3 Y = \Delta_2 C = b^2 \Delta I$$
$$\cdots$$
$$\Delta_j Y = \Delta_{j-1} C = b^{j-1} \Delta I$$

we have
我们有

$$
\begin{aligned}
\Delta Y &= \Delta I + b\Delta I + b^2 \Delta I + \cdots + b^{j-1}\Delta I + \ldots \\
&= \Delta I(1 + b + b^2 + b^3 + \cdots + b^{j-1} + b^j + \ldots)
\end{aligned}
\tag{9}
$$

The indefinitely long sum in parentheses reduces, by a theorem in high school algebra, to
括号中无限长的求和，根据高中代数的一个定理，可简化为

$$\frac{1}{1-b} \tag{10}$$

Thus, we have
因此，我们有

$$\Delta Y = \frac{\Delta I}{1-b} = k\Delta I$$

as before.
和之前一样。

The derivation of the multiplier by an infinite sequence focuses attention on the domino-like sequence of people's decisions and offers a way of analyzing unfolding events over time.
通过无限序列推导乘数，将注意力集中在人们决策的多米诺骨牌般的序列上，并提供了一种分析随时间展开的事件的方法。

However, it should be understood that time delays and discrete steps are not a necessary part of this analysis but must be considered in their own right.
然而，应该理解的是，时间延迟和离散步骤并不是这种分析的必要组成部分，而是必须作为其自身的权利加以考虑（必须单独考虑）。

The sequence just outlined, which suggests time lags between decisions, can equally well be thought of as occurring all at a single stroke.
刚才概述的序列暗示了决策之间的时间滞后，但同样可以被认为是一举完成（瞬间发生）的。

For example, suppose some added investment activity is announced on a Saturday evening, after the end of the workweek, to commence on Monday morning.
例如，假设在周六晚上，即工作周结束后，宣布了一些增加的投资活动将于周一早上开始。

Unemployed workers are notified to return to work on Monday morning on the new investment projects.
失业工人接到通知，周一早上回到新的投资项目工作。

Expecting their new paychecks, they plan higher purchases than before, beginning immediately; they call their grocers and other retailers to assure credit based on their expected paychecks.
预期到新的薪水，他们计划立即开始比以前更多的购买；他们致电杂货商和其他零售商，以预期的薪水为基础确保赊账。

These retailers shrewdly place new orders over the weekend with their wholesalers; the wholesalers similarly place increased orders with manufacturers, and the manufacturers increase their planned production runs while notifying previously laid-off workers to report to work Monday morning.
这些零售商在周末精明地向批发商下了新订单；批发商同样向制造商增加了订单，制造商增加计划的生产流程，同时通知之前被解雇的工人在周一早上报到工作。

These workers in turn plan increased spendings, get in touch with retailers, who call their wholesalers, who call manufacturers, who rehire workers, and so on ad infinitum.
这些工人反过来计划增加支出，联系零售商，零售商致电批发商，批发商致电制造商，制造商重新雇用工人，如此无限类推。

The whole process can be completed by Monday morning, so that at one

stroke, income rises by the full amount of the multiplier times new investment.
整个过程可以在周一早上之前完成，因此，收入瞬间增加了乘数乘以新投资的全部金额。

Indeed, all this could happen without any action by anyone to get in touch with his suppliers.
事实上，所有这些都可以在没有任何人采取行动联系其供应商的情况下发生。

Each retailer, wholesaler, and manufacturer could anticipate, without being told, what the effect on him would be, and the workers could likewise show up at their plants without being notified, in the correct expectation that work would be available.
每个零售商、批发商和制造商都可以在未被告知的情况下预期到对他产生的影响，工人们也同样可以在未接到通知的情况下出现在工厂，并正确地预期会有工作机会。

However, cumulative changes of income usually take time to work through the system, and it is often important to take this into account in practical analysis.
然而，收入的累积变化通常需要时间才能在系统中完成传导，在实际分析中考虑到这一点通常很重要。

It is not always necessary, however; one can put time delays in or leave them out, whichever is most satisfactory for the problem at hand.
但这并不总是必要的；人们可以加入时间延迟或将其忽略，取决于哪种方式最适合手头的问题。

The reasoning in this section enables us to predict how much income will change when investment changes, given our narrow assumptions.
基于我们狭义的假设，本节的推理使我们能够预测当投资发生变化时，收入会发生多少变化。

Before going on, we should note what this model implies about the relationship of saving to investment.
在继续之前，我们应该注意这个模型对储蓄与投资关系的暗示。

The proposition of equation (1), $C = A + bY$, that households decide how much to consume on the basis of their current incomes, is equivalent to saying that they decide how much to add to their wealth on the basis of their current incomes.
方程 (1) $C = A + bY$ 的命题，即家庭根据当前收入决定消费多少，等同于说他们根据当前收入决定增加多少财富。

Since saving, the planned addition to wealth, is equal to the difference between current income and consumption, we can use the information in equation (1) to find out how much people will save at different levels of income.
由于储蓄（计划的财富增加）等于当前收入与消费之差，我们可以利用方程 (1) 中的信息找出人们在不同收入水平下会储蓄多少。

$$S = Y - C = Y - A - bY$$
$$= -A + (1 - b)Y$$

If we look back at equation (2) and the derivation of equation (4), we find also that
如果我们回顾方程 (2) 和方程 (4) 的推导，我们还会发现

$$I_1 = Y - C = -A + (1 - b)Y$$

that is,
也就是说，

$$I_1 = S$$

That is, whatever the level of investment, the income it determines is that level of income at which households choose to add to wealth at a rate just equal to that investment.
也就是说，无论投资水平如何，它所确定的收入是这样一个收入水平：在此水平上，家庭选择增加财富的速率恰好等于该投资。

By assumption, saving does not influence investment directly or indirectly; their only relationship is through variations in income caused by variations in investment.
根据假设，储蓄不直接或间接地影响投资；它们唯一的关系是通过投资变化引起的收入变化来实现的。

In fact, in every model in which government and net foreign investment are consolidated into consumption and investment, saving equals investment.
事实上，在每一个将政府和净外国投资合并到消费和投资中的模型里，储蓄都等于投资。

In most other models, however, other variables than investment help determine income, and investment and saving are jointly dependent.
然而，在大多数其他模型中，除投资外的其他变量也有助于决定收入，且投资和储蓄是相互依赖的。

2.3 THE FIRST MODEL REPRESENTED GRAPHICALLY
第一个模型的图形表示

The model of income determination given by equations (1) and (2) is illustrated in Figure 1.
由方程 (1) 和 (2) 给出的收入决定模型如图 1 所示。

Equation (1), the consumption function, is the lower of the two parallel lines.
方程 (1)，即消费函数，是两条平行线中较低的一条。

Equation (3), the sum of the consumption function and the given quantity of investment, is the higher of the two lines.
方程 (3)，即消费函数与给定投资量之和，是两条线中较高的一条。

The two are parallel because investment is constant, that is, is assumed to be the same at every level of income.
这两条线是平行的，因为投资是常数，也就是说，假设在每个收入水平上投资都是相同的。

The higher line represents the total of desired expenditures—investment plus consumption—as a function of income.
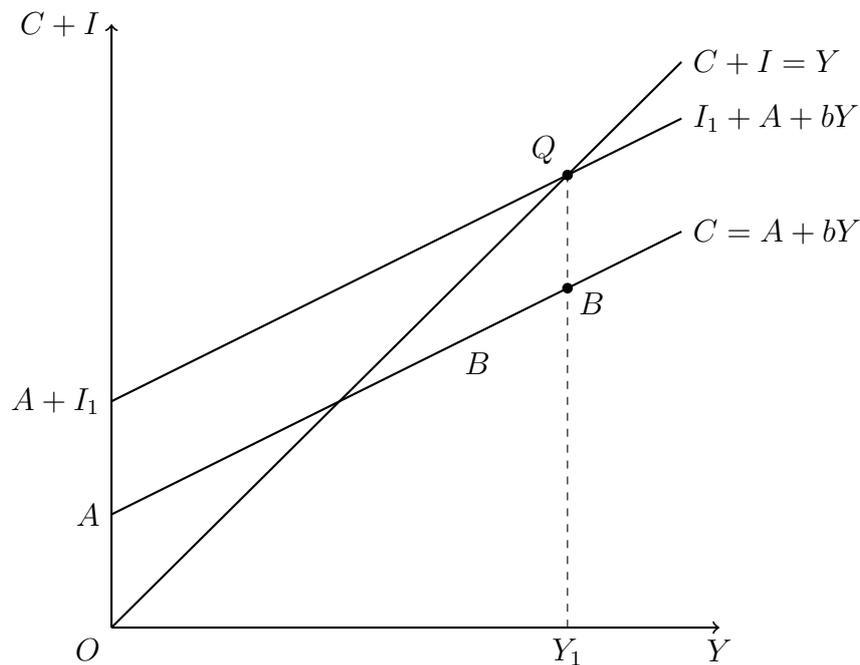较高的线代表期望支出总额——投资加消费——作为收入的函数。

Figure 1

The line in Figure 1 that passes through the origin and bisects the right angle formed by the axes represents equation (2), the accounting identity between income and product.
图 1 中通过原点并平分坐标轴直角的线代表方程 (2)，即收入与产出之间的会计恒等式。

Since consumption, investment, and income are measured in the same units, the height of a point on this line, representing consumption plus investment, is equal to its horizontal distance from the origin, representing income. This means that the slope of the line is $45°$, and it is generally called the "$45°$ line."
由于消费、投资和收入是用相同的单位衡量的，这条线上一点的高度（代表消费加投资）等于其到原点的水平距离（代表收入）。这意味着该线的斜率是 45°，通常被称为"45°线"。

The point Q at which the total expenditure line crosses the $45°$ line corresponds to the income Y_1 at which total expenditures equal the income that induces their consumption portion.

总支出线与 45° 线相交的点 Q，对应于收入 Y_1，在此收入水平上，总支出等于诱发其消费部分的收入。

This is the value of income obtained algebraically in equation (4) since the two lines intersect at that value of income at which equations (1) and (2) are both satisfied.

这就是在方程 (4) 中通过代数方法获得的收入值，因为这两条线相交于方程 (1) 和 (2) 同时满足的收入值上。

The height of the point B gives consumption at this income, and the remaining height BQ is the amount of saving and investment. One way to visualize the solution in this model is to note that the income Y_1 is the only one at which the gap between the consumption function and the 45° line, which gap represents saving, equals investment I_1.

点 B 的高度给出了在此收入下的消费，剩余的高度 BQ 是储蓄和投资的数量。在这个模型中形象化解的一种方法是注意到，收入 Y_1 是唯一的一个点，在此点上消费函数与 45° 线之间的缺口（代表储蓄）等于投资 I_1。

The multiplier is represented in Figure 2, in which we compare the results of two different levels of investment I_1 and I_2. When investment increases by the amount $I_2 - I_1 = \Delta I$, the total expenditure line is shifted upward by this amount.

乘数在图 2 中表示，我们在其中比较了两个不同投资水平 I_1 和 I_2 的结果。当投资增加量为 $I_2 - I_1 = \Delta I$ 时，总支出线向上平移该数量。

Its intersection with the 45° line moves from Q to R, and equilibrium income increases by the amount ΔY. ΔY is larger than ΔI, as it always will be when the total expenditure line slopes...

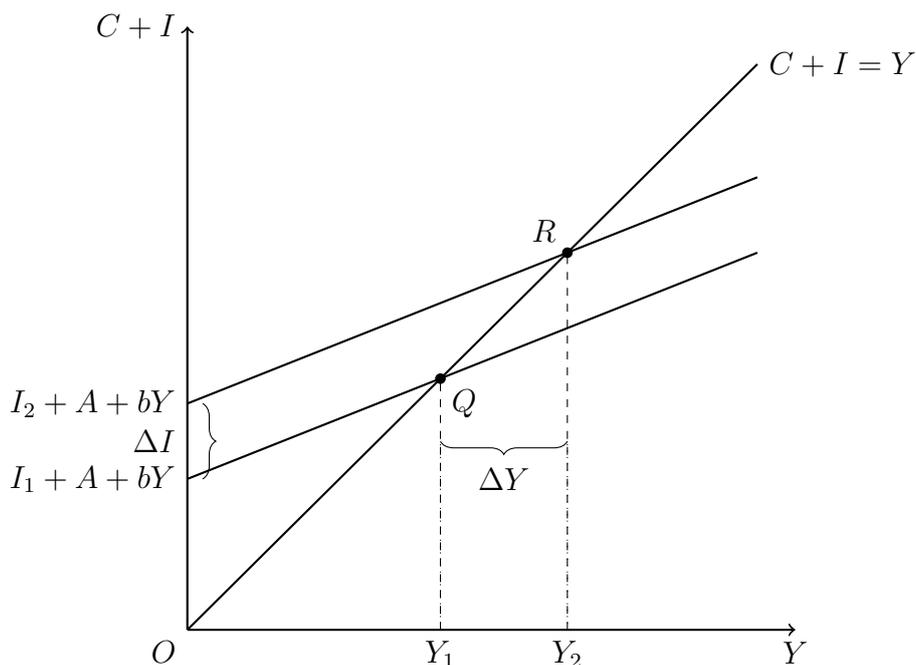它与 45° 线的交点从 Q 移动到 R，均衡收入增加了 ΔY。ΔY 大于 ΔI，这正如当总支出线倾斜……

Figure 2

...upward at a lower rate than the slope of the $45°$ line (that is, when $0 < b < 1$).
……向上但斜率低于 45° 线的斜率时（即当 $0 < b < 1$ 时）的情况一样。

Figure 3 illustrates the larger multiplier that results when the marginal propensity to consume b is closer to 1. When the slope of the total expenditure line is very close to that of the $45°$ line, a given increase in investment ΔI shifts the intersection Q of the two very far to the right to R. Thus the ratio $\Delta Y / \Delta I = k$ is very large in this case.
图 3 说明了当边际消费倾向 b 更接近 1 时产生的更大的乘数。当总支出线的斜率非常接近 45° 线的斜率时，给定的投资增加 ΔI 会将两者的交点 Q 向右移动很远至 R。因此，在这种情况下，比率 $\Delta Y / \Delta I = k$ 非常大。
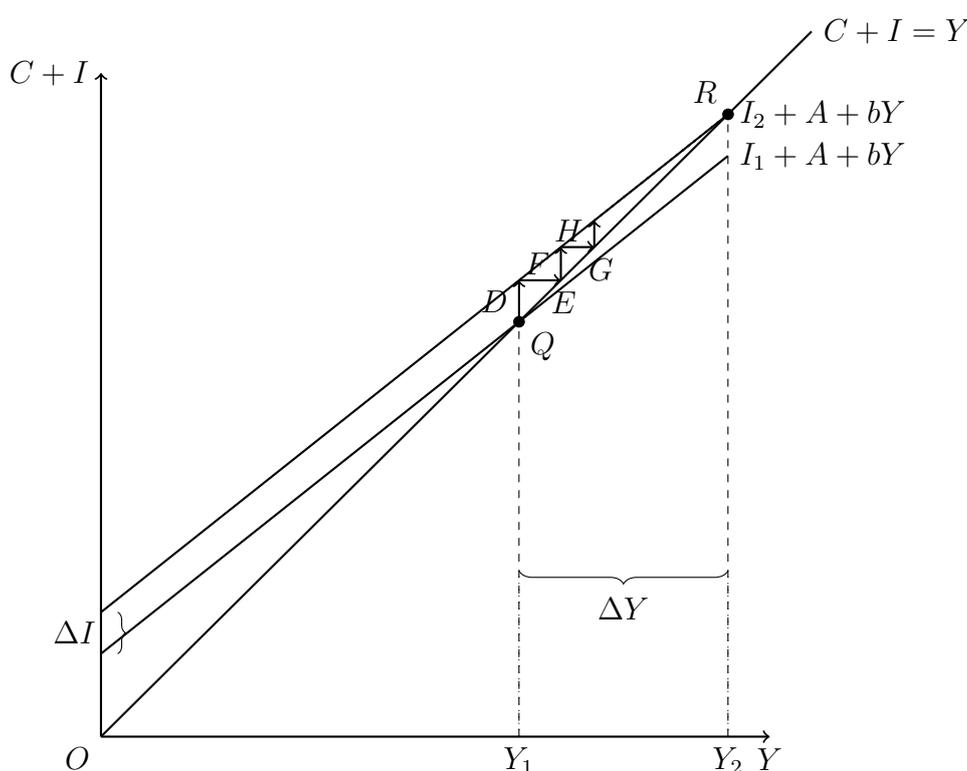

Figure 3

Figure 3 also illustrates the sequence by which the new equilibrium income Y_2 is approached, if one chooses to view it as a sequence.
图 3 还说明了逼近新均衡收入 Y_2 的序列过程（如果人们选择将其视为一个序列的话）。

When the initial equilibrium, with income at Y_1 and investment at I_1, is disturbed by the increase of investment to I_2, this itself increases the expenditures people desire to make, when income is at Y_1, from its level at Q to its level at D.
当收入为 Y_1、投资为 I_1 的初始均衡被投资增加到 I_2 所扰动时，这本身就增加了人们在收入为 Y_1 时想要进行的支出，从 Q 水平增加到 D 水平。

This additional expenditure raises income received to the level at E.
这一额外的支出将接收到的收入提高到了 E 水平。

At this increased level of income, however, people spend more on consumption, and, accordingly, expenditures increase to their level at F.

然而，在这个增加的收入水平上，人们在消费上花费更多，因此，支出增加到 F 水平。

Income is thus further increased to its level at G, which increases expenditures to their level at H, and so on.

收入因此进一步增加到 G 水平，这又将支出增加到 H 水平，依此类推。

The series of steps drawn in the figure in this way converges on the new equilibrium R, the steps getting smaller and smaller as they go. They are the $\Delta_j C$ of the preceding section.

图中画出的这一系列阶梯以这种方式收敛于新均衡 R，阶梯随着进行变得越来越小。它们就是上一节中的 $\Delta_j C$。

2.4 PROPERTIES OF THE MODEL WHEN INVESTMENT DEPENDS ON THE RATE OF INTEREST
当投资取决于利率时模型的性质

Our next step in the analysis of national income is to consider investment as a schedule rather than as a given quantity. In particular, we assume that the level of investment is a function of the rate of interest.

我们国民收入分析的下一步是将投资视为一个计划表（函数），而不是一个给定的数量。特别是，我们假设投资水平是利率的函数。

The investment schedule is a demand schedule for resources for specific physical additions to wealth.

投资表是对特定实物财富增量资源的某种需求表。

These additions to wealth are expected to yield net income after provision for their maintenance.

这些财富增量在扣除维护费用后，预期会产生净收入。

Against this expected income must be set either the cost of financing them, through borrowing or the sale of equities, or, if the liquid capital is already available, the income it could earn some other way.

必须将这种预期收入与融资成本进行对比，融资可以通过借款或出售股票进行；或者，如果已经拥有流动资金，则应与其通过其他方式可能赚取的收入（机会成本）进行对比。

The investment a firm undertakes is determined by comparing the net incomes expected from the investment opportunities it has with the cost or "availability" of funds.

企业进行的投资取决于将其拥有的投资机会的预期净收入与资金的成本或"可获得性"进行比较。

Generally speaking, it will not be worthwhile to undertake all the known opportunities, given the cost or alternative earnings of investment funds.

一般来说，考虑到投资基金的成本或替代收益，承担所有已知的机会是不值得的。

The firm will have to rank its investments by priority and cut off some of the lower priority ones. If circumstances should change so that investment with lower prospective net incomes can be considered, some additional investment will be undertaken.
企业必须按优先级对投资进行排序，并砍掉一些优先级较低的投资。如果情况发生变化，使得具有较低预期净收入的投资也可以被考虑，那么就会进行一些额外的投资。

There are often several ways to finance any investment, with various terms and conditions.
任何投资通常都有几种融资方式，条款和条件各不相同。

As in other aspects of these models, we need a simplification that is both convenient and reasonably accurate.
正如这些模型的其他方面一样，我们需要一个既方便又相当准确的简化。

Accordingly, we assume that a good proxy variable for the combined effect of all factors involved in the cost or availability of investment funds is the rate of interest on a standard, highly marketable interest-bearing security such as a long-term government bond.
因此，我们假设，一个能代表涉及投资基金成本或可获得性的所有因素综合效应的良好代理变量，是标准的、高流动性的生息证券（如长期政府债券）的利率。

This assumption serves well if variations in the overall conditions in securities markets are well correlated with variations in the interest rate selected as the proxy variable.
如果证券市场的整体状况变化具有良好的相关性，这一假设就很适用与被选为代理变量的利率变化高度相关。

At high rates of interest each firm will cut off its investment at a smaller amount than at low rates because of the ranking by priority or profitability.
在利率较高时，由于按优先级或盈利能力排序，每家企业将在较小的金额上截止其投资，而在利率较低时则不然。

To the extent that different rates of interest and related conditions are correlated, the volume of investment undertaken by business firms can be accurately represented by a schedule showing low investment at high rates of interest and high investment at low rates of interest.
在不同利率和相关条件相关的范围内，企业进行的投资量可以准确地用一个图表来表示，该图表显示高利率时投资低，低利率时投资高。

Thus in Figure 4 the downward-sloping curve $I = G_0 + G_1 i$ represents the...
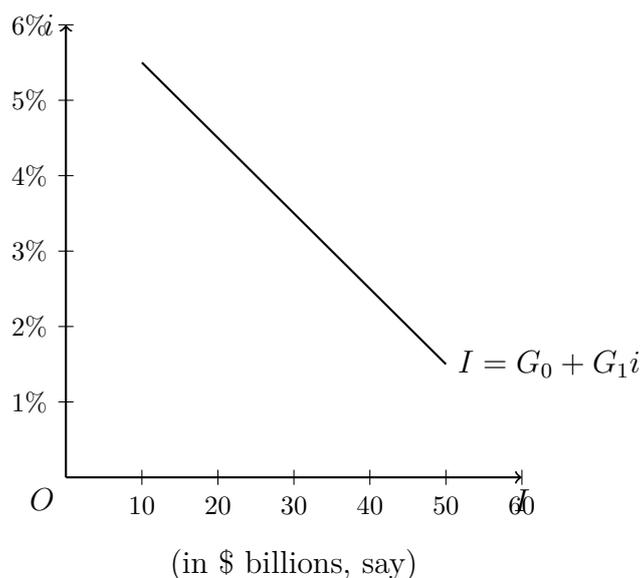因此，在图 4 中，向下倾斜的曲线 $I = G_0 + G_1 i$ 代表了⋯⋯

Figure 4

...**different amounts of investment** I **at different rates of interest** i**, where** G_0 **and** G_1 **are constants, with** $G_1 < 0$**.**
……不同利率 i 下的不同投资量 I，其中 G_0 和 G_1 是常数，且 $G_1 < 0$。

This curve is the investment function. For simplicity we assume, as in the case of the consumption function, that the investment function is linear, but its fundamental characteristic is its negative slope.
这条曲线就是投资函数。为了简单起见，我们假设（就像消费函数的情况一样）投资函数是线性的，但其基本特征是负斜率。

The investment function changes the income model by adding one more equation and one more variable. The model now has three equations.
投资函数通过增加一个方程和一个变量改变了收入模型。该模型现在有三个方程。

$$\begin{aligned} I &= G_0 + G_1 i \\ C &= A + bY \quad ,(1),(2) \\ Y &= C + I \end{aligned} \tag{11}$$

We now have three variables I**,** C**, and** Y **if we take the rate of interest** i_1 **as given, as we had previously done for investment.**
如果我们像之前对待投资那样将利率 i_1 视为既定，我们现在有三个变量 I、C 和 Y。

In place of equation (6) we now obtain by the same procedure
代替方程 (6)，我们现在通过相同的程序获得

$$Y_1 = \frac{A + G_0 + G_1 i_1}{1 - b} \tag{12}$$

A definite value for income is determined, as before.
和一个确定的收入值被决定了，正如之前一样。

20

Because of the similarity between (4) and (12), the multiplier is the same in this model as in the previous one.
由于方程 (4) 和 (12) 之间的相似性，这个模型中的乘数与前一个模型中的乘数是相同的。

Now, however, a change in the rate of interest is a possible cause of a change in income.
然而，现在，利率的变化成为了收入变化的一个可能原因。

When the rate of interest changes from i_1 to i_2, there is a resultant change in investment given by the investment function.
当利率从 i_1 变为 i_2 时，投资函数会给出一个相应的投资变化。

The change in income is still $\Delta Y = k\Delta I$.
收入的变化仍然是 $\Delta Y = k\Delta I$。

We may think of the line of causation in this model as running from the rate of interest to investment to income and consumption.
我们可以认为这个模型中的因果链条是从利率到投资，再到收入和消费。

(Income and consumption interact with each other and so are jointly determined.)
（收入和消费相互影响，因此是共同决定的。）

For each assumed rate of interest, there is a resultant level of income: in particular, lower rates of interest imply higher incomes, because they imply higher levels of investment, and k is positive.
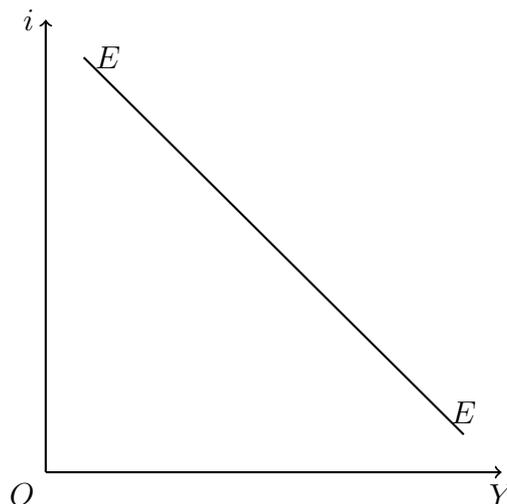对于每一个假设的利率，都有一个相应的收入水平：特别是，较低的利率意味着较高的收入，因为它们意味着较高的投资水平，且 k 是正数。

Figure 5

Figure 5 presents equation (12) graphically. The curve EE slopes downward, indicating higher incomes at lower rates of interest.
图 5 以图形方式展示了方程 (12)。曲线 EE 向下倾斜，表明在较低的利率下收入较高。

The steepness with which it slopes downward is the product of two factors: the amount by which investment increases with a given fall in the interest rate, and the multiplier.
其向下倾斜的陡峭程度是两个因素的乘积：随着给定利率下降而增加的投资量，以及乘数。

That is, its slope is kG_1, referred to the vertical axis.
也就是说，相对于纵轴而言，其斜率是 kG_1。

The curve EE tells us the level of income at each interest rate at which desired expenditures equal income.
曲线 EE 告诉我们在每个利率水平上，期望支出等于收入时的收入水平。

Along it consumers are satisfied with the allocation of their incomes between saving and consumption.
沿着这条曲线，消费者对其收入在储蓄和消费之间的分配感到满意。

Another way of stating this is that this curve gives the level of income at each interest rate at which investment equals desired saving.
另一种说法是，这条曲线给出了在每个利率水平上，投资等于期望储蓄时的收入水平。

We noted the savings-investment equality at the end of section 2 above. For this reason the curve EE is sometimes designated the IS curve.
我们在上文第 2 节末尾注意到了储蓄-投资的相等关系。因此，曲线 EE 有时被称为 IS 曲线。

For the purposes of further analysis the curve EE will be viewed in another light.
为了进一步分析，我们将从另一个角度看待曲线 EE。

If the rate of interest i is regarded as a variable rather...
如果利率 i 被视为一个变量，而不是⋯⋯

...than as an arbitrary, given number, the three equations (11), (1), and (2) contain four variables, namely, i, I, C, and Y.
⋯⋯而不是一个任意的、给定的数值，那么这三个方程 (11)、(1) 和 (2) 包含四个变量，即 i、I、C 和 Y。

These three equations in four unknowns do not determine any of the unknowns, but they combine into a single equation in any two variables.
这三个包含四个未知数的方程不能确定任何一个未知数，但它们可以组合成任意两个变量的单个方程。

This is what was done in obtaining equation (12), which contains only the two variables Y and i (where i is now a variable).
这就是获得方程 (12) 所做的工作，该方程仅包含两个变量 Y 和 i（其中 i 现在是一个变量）。

The curve EE and the equations that underlie it will be referred to as the

expenditure sector of the economy.
曲线 EE 及其背后的方程将被统称为经济的支出部门（或商品市场）。

As they stand, they represent a simplified, indeed an oversimplified, model of national income determination.
就目前而言，它们代表了一个简化的，实际上是过度简化的国民收入决定模型。

From a broader point of view, they form one sector of a complete model of income determination. We now turn to the other sectors.
从更广阔的视角来看，它们构成了完整的收入决定模型的一个部门。我们现在转向其他部门。

2.5 THE MONETARY SECTOR: THE DEMAND FOR AND SUPPLY OF CASH BALANCES
货币部门：现金余额的需求与供给

Each household owns a variety of assets that compose its total present wealth.
每个家庭都拥有构成其当前总财富的各种资产。

Given this available total, the household must decide from time to time which assets to keep and, in particular, how much to hold in its cash balance and how much in assets yielding income or direct services.
鉴于这一可用的总量，家庭必须不时决定持有哪种资产，特别是，在其现金余额中持有多少，以及在产生收入或直接服务的资产中持有多少。

Such decisions cover the whole collection of assets, but the one concerning the proportions of their assets to hold in cash determines a demand function, in which both income and the rate of interest are variables.
这些决策涵盖了整个资产集合，但关于持有现金占资产比例的决策确定了一个需求函数，其中收入和利率都是变量。

We assume that these are the only variables in this function.
我们假设这些是该函数中唯一的变量。

Further, we assume that the desired aggregate quantity of cash balances increases with increasing income and decreases with increasing rates of interest.
此外，我们假设期望的现金余额总量随收入增加而增加，随利率上升而减少。

These relationships are expressed in the function
这些关系表达在以下函数中：

$$M = L(i, Y) \tag{13}$$

usually called the *liquidity preference function*, because it relates to the choice between the liquid asset cash and other assets.
通常称为**流动性偏好函数**，因为它涉及流动性资产（现金）与其他资产之间的选择。

It is illustrated in Figure 6. The figure shows a family of curves relating desired cash to the interest rate, one curve for each level of income; the higher curves correspond to higher levels of income, the lower ones to lower levels of income.
如图 6 所示。该图显示了一组将期望现金与利率联系起来的曲线，每一条曲线对应一个收入水平；较高的曲线对应较高的收入水平，较低的曲线对应较低的收入水平。

That is, $Y_1 < Y_2 < Y_3$. The individual curves slope downward, showing higher cash balances demanded at lower interest rates, as assumed.
也就是说，$Y_1 < Y_2 < Y_3$。单条曲线向下倾斜，表明如假设的那样，在较低利率下人们需求更高的现金余额。

We shall review briefly the reasons for the assumed properties of the cash-balance demand function (13).
我们将简要回顾现金余额需求函数 (13) 假设性质的原因。

The household's and firm's decision how much cash, on the average, to hold is at the same time a decision about the arrangement of cash receipts and payments.
家庭和企业关于平均持有多少现金的决策，同时也是关于现金收支安排的决策。

How often a house-...
一个家庭多久……

i

$L(i, Y_3)$
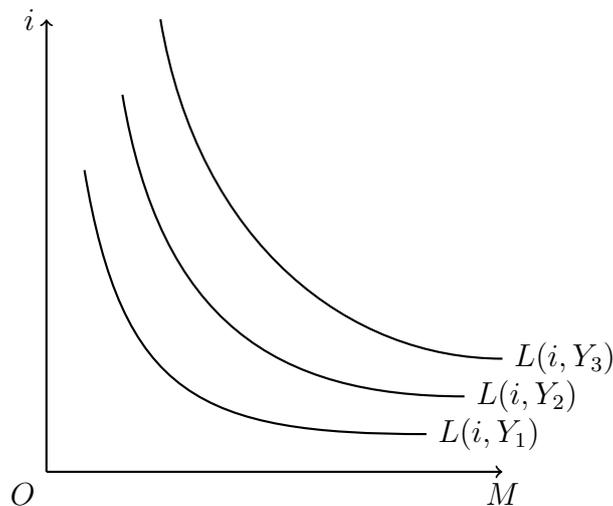$L(i, Y_2)$
$L(i, Y_1)$

O   M

Figure 6

...holder receives his paycheck—weekly, biweekly, or monthly—can be negotiated with the employing firm and does sometimes change; the same is true of other receipts.
……收到薪水——每周、每两周或每月——是可以与雇佣公司协商的，有时确实会改变；其他收入也是如此。

Payment times are even more flexible. A household can, if it wishes, reduce its average cash balance almost to zero by buying virtually everything on credit and paying off debts on payday.
支付时间甚至更加灵活。如果愿意，家庭可以通过赊购几乎所有东西并在发薪日偿还债务，将其平均现金余额减少到几乎为零。

Any excess of receipts over these debts can be invested immediately in securities or other assets.

任何超过这些债务的收入盈余都可以立即投资于证券或其他资产。

For most households, however, doing so involves more inconvenience than it is worth, and goods bought on credit generally cost more than those bought for cash.

然而，对于大多数家庭来说，这样做带来的不便超过了其价值，而且赊购的商品通常比现金购买的商品更贵。

The typical household therefore chooses to hold some cash most of the time. The same is true of the typical business firm.

因此，典型的家庭选择在大部分时间持有一定量的现金。典型的商业公司也是如此。

How large an average cash balance the household or firm chooses to hold depends, among other things, on the sacrifice of income that results from holding cash rather than other assets and on the saving that results from paying promptly rather than buying on credit.

家庭 or 企业选择持有多少平均现金余额，除其他因素外，取决于持有现金而非其他资产所导致的收入牺牲（机会成本），以及取决于立即付款而非赊购所产生的储蓄。

As we did with business decisions to invest, we assume that a good proxy variable for the combined effect of these factors is the standard rate of interest.

正如我们处理企业的投资决策一样，我们假设这些因素综合效应的一个良好代理变量是标准利率。

When the rate of interest is high, it is generally worthwhile for firms and households to pay their debts more promptly and to press for more prompt and frequent payment of their receivables.

当利率较高时，企业和家庭更及时地偿还债务，并催促更及时、更频繁地收取应收账款，通常是值得的。

This is particularly true of business firms, which hold a low ratio of cash balances to total cash turnover.

对于现金余额占总现金周转率比例较低的商业公司来说，尤其如此。

Their cash holdings will be relatively sensitive to the related costs, because the skill with which they manage their cash has a significant effect on their profits.

它们的现金持有量将对相关成本相对敏感，因为它们管理现金的技巧对其利润有显著影响。

Accordingly, when the rate of interest is high, noncash assets are relatively attractive for everyone; people will tend to arrange their affairs so that a larger share of their assets earns income and a smaller share is in cash.

因此，当利率较高时，非现金资产对每个人都相对具有吸引力；人们将倾向于安排自己的事务，以便更大比例的资产赚取收入，而更小比例的资产以现金形式存在。

When the rate of interest is low, the convenience afforded by increased cash

balances costs relatively little income, so that relatively...
当利率较低时，增加现金余额所带来的便利所花费的收入相对较少，因此相对……

...more will be held. Hence, with income fixed, the aggregate demand curve for cash balances, a function of the interest rate, will slope downward.
……较多的现金将被持有。因此，在收入固定的情况下，现金余额的总需求曲线（利率的函数）将向下倾斜。

How much cash people hold, in preference to other assets, will depend on other factors as well, the most important of which is income.
人们持有多少现金（相对于其他资产），还将取决于其他因素，其中最重要的是收入。

When households experience an increase in income, they typically allow some additional cash balance to accumulate before they dispose of the increased income on consumption and on noncash assets.
当家庭收入增加时，他们通常会允许积累一些额外的现金余额，然后再将增加的收入用于消费和非现金资产。

The same is true of business firms, which will find it worthwhile to increase cash balances when the flow of transactions increases. This flow is highly correlated with income.
商业公司也是如此，当交易流增加时，它们会发现增加现金余额是值得的。这种流量与收入高度相关。

Thus both household and business demand for cash balances will increase with increasing income.
因此，家庭和企业的现金余额需求都将随收入增加而增加。

This discussion of cash balances has assumed free choice by individual households and firms among their assets.
关于现金余额的讨论假设了单个家庭和企业在其资产中拥有自由选择权。

From the point of view of each one, this assumption is correct about cash and readily marketable assets.
从每一个体的角度来看，关于现金和易于销售的资产，这一假设是正确的。

Nothing prevents an individual household or firm from altering its cash balance at will by exchanging cash for other assets (although its willingness to do so will be affected by brokerage fees and other transaction costs).
没有什么能阻止单个家庭或企业通过将现金兑换为其他资产来随意改变其现金余额（尽管其这样做的意愿会受到经纪费和其他交易成本的影响）。

For the community as a whole, however, such free choice is not generally possible.
然而，对于整个社会而言，这种自由选择通常是不可能的。

Although the gross amounts of various types of wealth, particularly financial claims, can to some extent be changed by financial institutions substituting one for the other, these possibilities are limited.

尽管各种类型的财富（特别是金融债权）的总量可以在一定程度上通过金融机构相互替代来改变，但这些可能性是有限的。

In particular, if the monetary authorities choose to hold the total quantity of money constant, households and firms can only pass around the existing cash balances among each other and cannot all get more at once.
特别是，如果货币当局选择保持货币总量不变，家庭和企业只能相互传递现有的现金余额，而不能同时获得更多。

If desired cash balances differ from actual cash balances, equalization must come about in some other way than by a change in the quantity of money, in this case.
如果期望的现金余额与实际现金余额不同，在这种情况下，均衡必须通过货币数量变化以外的其他方式来实现。

If everyone tries at the same time to alter the composition of his assets in the direction of more cash balances, his attempt to do so by selling securities will result in a fall in security prices, which means a rise in the rate of interest.
如果每个人都试图同时改变其资产构成，以持有更多现金余额，他通过出售证券来实现这一点的尝试将导致证券价格下跌，这意味着利率上升。

A rise in the rate of interest reduces desired cash balances toward equality with actual cash balances.
利率上升会减少期望的现金余额，使其趋向于与实际现金余额相等。

Thus, in Figure 7, if income is Y_1, the demand curve for cash balances is $L(i, Y_1)$.
因此，在图 7 中，如果收入是 Y_1，现金余额的需求曲线是 $L(i, Y_1)$。

If the quantity of money were M_1 and the interest rate were i_2, the quantity demanded of cash balances, M_2, would exceed the actual quantity available.
如果货币数量是 M_1 且利率是 i_2，现金余额的需求量 M_2 将超过实际可用数量。

As everyone tries to sell securities for cash, however, the interest rate is driven up to i_1, at which point the community is satisfied with the amount of cash available, M_1.
然而，当每个人都试图出售证券换取现金时，利率被推高至 i_1，此时社会对可用的现金数量 M_1 感到满意。

At any given level of income, the interaction between the demand for cash balances and their supply determines the rate of interest.
在任何给定的收入水平下，现金余额需求与其供给之间的相互作用决定了利率。

At a different level of income, this interaction determines a different rate of...
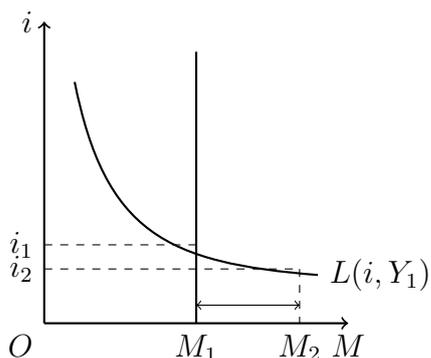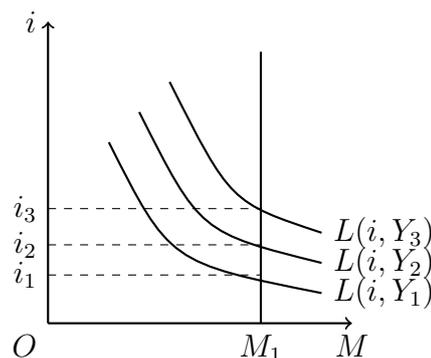在不同的收入水平下，这种相互作用决定了不同的……

Figure 7

Figure 8

...interest, since the demand curve for cash balances is different.
……利率，因为现金余额的需求曲线是不同的。

In Figure 8, the interest rates which equalize the quantity demanded of cash balances to the supply M_1 at incomes Y_1, Y_2, and Y_3 are i_1, i_2, and i_3, respectively.
在图 8 中，在收入 Y_1、Y_2 和 Y_3 下，使现金余额需求量与供给 M_1 相等的利率分别是 i_1、i_2 和 i_3。

Generally the monetary authorities do not in fact keep the quantity of money constant.
通常，货币当局实际上并不保持货币数量不变。

Besides permitting the quantity of money to increase in step with the growth of the economy over long periods, in short periods they have allowed it to fluctuate up and down with fluctuations in general business conditions.
除了允许货币数量随经济的长期增长而同步增加外，在短期内，他们还允许货币数量随一般商业状况的波动而上下波动。

This is the normal reaction of the commercial banking system, if the authorities do not try to prevent it.
如果当局不试图阻止，这是商业银行体系的正常反应。

In periods of business decline, firms try to reduce inventories and to repay their bank loans; their doing so extinguishes bank deposits and reduces the quantity of money.
在商业衰退期，企业试图减少库存并偿还银行贷款；他们这样做会注销银行存款并减少货币数量。

The banks themselves are likely to accept this, because in periods of poor business they want to reduce their risky commitments.
银行本身也可能接受这一点，因为在商业不景气时期，它们希望减少风险敞口。

This could be prevented only by an aggressive monetary policy that placed so much additional reserves in the banks as to make them willing to keep their loans and other commitments up to the old level.
这只有通过激进的货币政策才能防止，即向银行注入大量额外准备金，使其愿意将贷款和其他承诺保持在原有水平。

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Although they sometimes move in this direction, the monetary authorities do not typically go this far.
尽管他们有时会朝这个方向努力，但货币当局通常不会做得这么彻底。

The upshot is that when national income declines, both the quantity of money and the rate of interest drift downward, and when national income recovers, both drift upward.
结果是，当国民收入下降时，货币数量和利率都会向下漂移，而当国民收入复苏时，两者都会向上漂移。

The combined actions of the monetary authorities and the banking system have the effect of producing an upward-sloping supply curve of money, as illustrated by the curve in Figure 9.
货币当局和银行体系的联合行动产生了产生向上倾斜的货币供给曲线的效果，如图 9 中的曲线所示。

This curve
这条曲线

$$M = h(i) \tag{14}$$

will shift from time to time with shifts in the policies of the monetary authorities, as occurs when they become alarmed about a really serious...
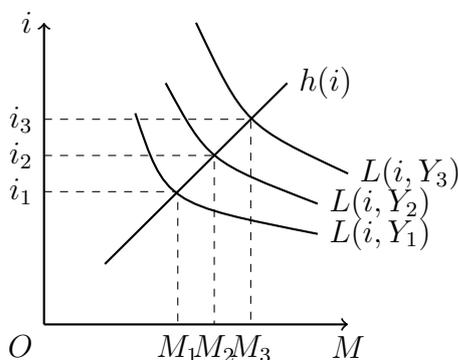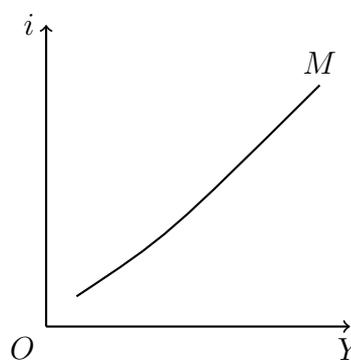将随着货币当局政策的转变而不时移动，例如当他们对真正严重的……感到警觉时。

Figure 9

Figure 10

...decline in national income or about an unusually rapid rise in the price level in prosperous times.
……国民收入下降或繁荣时期价格水平异常快速上涨感到警觉时。

Over a limited range of fluctuations in income, however, the curve can be regarded as a single, fixed curve. We assume therefore that the supply of money is an increasing function of the rate of interest.
然而，在收入波动的有限范围内，该曲线可被视为一条单一的、固定的曲线。因此，我们假设货币供给是利率的增函数。

The two equations
这两个方程

$$M = L(i, Y)$$
$$M = h(i) \qquad , (14) \tag{13}$$

contain the three variables M, i, and Y. They do not determine any of the variables but can be collapsed into one equation in two unknowns.
包含三个变量 M、i 和 Y。它们不能确定任何变量，但可以合并为一个包含两个未知数的方程。

For example, we can eliminate M simply by writing
例如，我们可以简单地通过写出下式来消去 M

$$h(i) = L(i, Y) \tag{15}$$

which gives us a single equation in i and Y.
这给了我们一个关于 i 和 Y 的单一方程。

In Figure 9, if we consider only the intersections between $h(i)$ and successive curves of the family $L(i, Y)$, we see that equilibrium in the monetary sector occurs at higher interest rates when income is higher and at lower interest rates when income is lower.
在图 9 中，如果我们仅考虑 $h(i)$ 与 $L(i, Y)$ 族中连续曲线的交点，我们会看到货币部门的均衡发生在较高的收入时利率较高，收入较低时利率较低。

(This follows from our assumptions about the demand and the supply of money; it is true also in Figure 8, where the supply of money is considered fixed, and it will be true for almost any likely behavior of the monetary sector.)
（这源于我们关于货币需求和供给的假设；在图 8 中也是如此，那里货币供给被认为是固定的，而且对于货币部门几乎任何可能的行为来说，这都是正确的。）

Equation (15) is the curve MM in Figure 10. This curve gives the value of the interest rate, for each level of income, at which the monetary sector is in equilibrium (that is, everyone is satisfied with the allocation of his wealth between money and other assets).
方程 (15) 是图 10 中的曲线 MM。这条曲线给出了在每个收入水平上，货币部门处于均衡状态（即每个人都对其财富在货币和其他资产之间的分配感到满意）时的利率值。

Its upward slope indicates that this equilibrium produces higher interest rates when income is higher.
其向上的斜率表明，当收入较高时，这种均衡会产生较高的利率。

2.6 THE MODEL WITH EXPENDITURE AND MONETARY SECTORS
包含支出和货币部门的模型

The equations of the expenditure sector and of the monetary sector are the following five relationships:
支出部门和货币部门的方程是以下五个关系式：

$$C = A + bY$$
$$Y = C + I$$
$$I = G_0 + G_1 i, (2), (11), (13), (14) \tag{1}$$
$$M = L(i, Y)$$
$$M = h(i)$$

These contain five variables: C, Y, I, i, and M. The number of equations equals the number of unknowns; given the assumed slopes of these functions, they determine a single equilibrium value for each variable.
这些方程包含五个变量：C、Y、I、i 和 M。方程的数量等于未知数的数量；给定这些函数的假设斜率，它们为每个变量确定了一个单一的均衡值。

We saw that the expenditure sector and the monetary sector each combine into a single equation in the rate of interest and income.
我们看到，支出部门和货币部门各自合并为一个关于利率和收入的单一方程。

$$Y = \frac{A + G_0 + G_1 i}{1 - b}, (15) \tag{12}$$
$$h(i) = L(i, Y)$$

These together determine equilibrium values i_1 and Y_1.
这两个方程共同决定了均衡值 i_1 和 Y_1。

[The equilibrium values of the other variables can then be obtained, if desired, by letting $i = i_1$ in equations (11) and (14) and letting $Y = Y_1$ in (1).]
（如果需要，其他变量的均衡值可以通过在方程 (11) 和 (14) 中令 $i = i_1$，在 (1) 中令 $Y = Y_1$ 来获得。）

This is illustrated in Figure 11, which puts together the curves for these two equations, which had separately been shown in Figures 5 and 10.
如图 11 所示，它将这两个方程的曲线放在一起，这两个方程之前分别在图 5 和图 10 中展示过。

EE is the curve representing combinations of i and Y that correspond to equilibrium in the expenditure sector, and MM is the curve representing combinations of i and Y that correspond to equilibrium in the monetary sector.
EE 是代表对应于支出部门均衡的 i 和 Y 组合的曲线，MM 是代表对应于货币部门均衡的 i 和 Y 组合的曲线。

Their intersection at the point A gives the one combination i_1 and Y_1 that corresponds to simultaneous equilibrium in both sectors, that is, to overall equilibrium in the whole model.

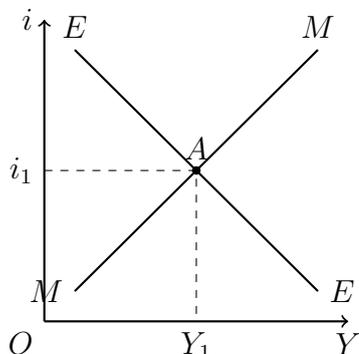它们在点 A 的交点给出了对应于两个部门同时均衡（即整个模型的总体均衡）的唯一组合 i_1 和 Y_1。
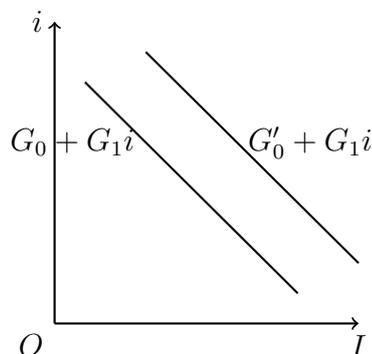

Figure 11

Figure 12

Now consider what happens to these equilibrium values when something in the model changes.

现在考虑当模型中的某些东西发生变化时，这些均衡值会发生什么。

For example, suppose that the investment function $G_0 + G_1 i$ shifts upward, because businessmen have become more optimistic about the prospects of their investments.

例如，假设投资函数 $G_0 + G_1 i$ 向上移动，因为商人对他们的投资前景变得更加乐观。

The old function $G_0 + G_1 i$ shifts up to a new position $G'_0 + G_1 i$, as shown in Figure 12.

旧函数 $G_0 + G_1 i$ 向上移动到新位置 $G'_0 + G_1 i$，如图 12 所示。

In equation (12) we can see that this will result in a higher equilibrium value of income for the expenditure sector at each rate of interest, because G'_0 is greater than G_0.

在方程 (12) 中我们可以看到，这将导致支出部门在每个利率下的均衡收入值更高，因为 G'_0 大于 G_0。

In fact, the discussion in sections 3 and 4 makes it clear that the increase in income in the expenditure sector, at any given rate of interest, is equal to the multiplier times G'_0 minus G_0.

事实上，第 3 节和第 4 节的讨论清楚地表明，在任何给定利率下，支出部门收入的增加等于乘数乘以 G'_0 减去 G_0。

That is, the expenditure sector curve EE will shift to the right by the amount

也就是说，支出部门曲线 EE 将向右移动以下数量

$$(\Delta Y)_{i=\text{const}} = k(\Delta I)_{i=\text{const}}$$
$$= k(G_0' + G_1 i - G_0 - G_1 i)$$
$$= k(G_0' - G_0)$$
$$= k\Delta G_0$$

This is shown in Figure 13, in which the expenditure sector curve shifts from $E_1 E_1$ to $E_2 E_2$.
这在图 13 中显示，其中支出部门曲线从 $E_1 E_1$ 移动到 $E_2 E_2$。

As a result, the overall equilibrium of the whole model will shift from the point A to the point B, at which both income and the rate of interest are higher than before.
结果，整个模型的总体均衡将从点 A 移动到点 B，在点 B 处，收入和利率都比以前高。

The increase in income, from Y_1 to Y_2, is not as large as the shift in the EE curve measured in the income direction, that is, measured along a horizontal line.
收入的增加，从 Y_1 到 Y_2，并不像在收入方向上（即沿着水平线测量）测量的 EE 曲线的移动那么大。

The upward slope of MM causes it to cut the new EE curve at a point to the left of C, that is, at a smaller income than Y_3.
MM 的向上斜率导致它在 C 点左侧的一点切割新的 EE 曲线，即在比 Y_3 更小的收入处。
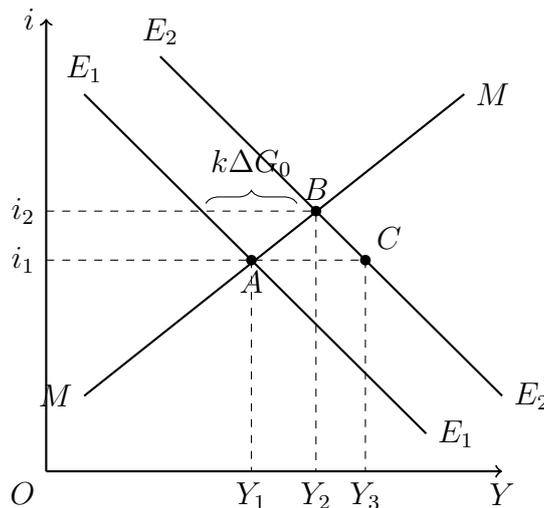
Had...
如果······

Figure 13

...income increased by the full shift of the curve, from Y_1 to Y_3, its increase would be equal to the multiplier times the shift in the investment function; thus in the present model the direct use of the multiplier would result in overstatement of the rise in income.

……收入按曲线的全部移动量增加，即从 Y_1 到 Y_3，其增加量将等于乘数乘以投资函数的移动量；因此，在当前模型中，直接使用乘数将导致高估收入的增长。

The multiplier plays an important secondary role in this model, however, in that it is a factor both in the slope of the EE curve and in the shift of that curve.
然而，乘数在这个模型中起着重要的次要作用，因为它是 EE 曲线斜率和该曲线移动的一个因素。

That the rise in income resulting from increased investment is less than the rise in investment at the initial rate of interest, is due to the damping effect on investment of the rise in the rate of interest.
由投资增加引起的收入增加小于初始利率下的投资增加，这是由于利率上升对投资产生的抑制（阻尼）效应。

The rise in the rate of interest is due to the tendency of income to rise, which shifts the demand curve for cash balances to the right; the banks and monetary authorities supply the additional money demanded only at an increased rate of interest.
利率上升是由于收入有上升的趋势，这使得现金余额的需求曲线向右移动；银行和货币当局只有在利率提高时才提供所需的额外货币。

Although investment still goes up, its rise is partly held back by the rise in the rate of interest, and therefore the total rise in expenditure, including due allowance for multiplier effects, is partly held back.
虽然投资仍然上升，但其上升部分受到利率上升的抑制，因此总支出的上升（包括对乘数效应的适当考虑）也部分受到抑制。

In a limited sense the multiplier still applies. Equation (12) is still part of the model, and it is satisfied both at the new equilibrium and at the old one.
在有限的意义上，乘数仍然适用。方程 (12) 仍然是模型的一部分，并且在新旧均衡点都得到满足。

The reasoning initially used in presenting the multiplier, in section 2, therefore still applies; it is still formally true that $Y = k\Delta I$.
因此，第 2 节中最初用于提出乘数的推理仍然适用；形式上 $Y = k\Delta I$ 仍然是正确的。

The quantity ΔI has a new meaning, however. It is not an arbitrary or predetermined increase but that increase in investment that actually takes place as part of the simultaneous satisfaction of the whole system after the shift in the investment function.
然而，数量 ΔI 有了新的含义。它不是任意的或预定的增加，而是在投资函数移动后，作为整个系统同时满足的一部分而实际发生的投资增加。

Hence the multiplier cannot provide a short-cut method for finding out the ultimate increase in income without considering the full interaction of the whole system; the size of…
因此，如果不考虑整个系统的充分相互作用，乘数就不能提供找出收入最终增加的捷径；……的大小

...the shift ΔG_0 in the investment function does not in general tell us what the ultimate change in investment, and therefore income, will be.
……投资函数中的移动量 ΔG_0 通常不会告诉我们投资（以及因此收入）的最终变化将是多少。

2.7 FURTHER PROPERTIES OF THE MORE COMPLETE MODEL OF INCOME DETERMINATION
更完整的收入决定模型的进一步性质

Besides the effect of a shift in the investment function, we can analyze a shift in any of the functions in a straightforward way.
除了投资函数移动的影响外，我们还可以通过直接的方式分析任何函数的移动。

For example, suppose the constant term A in the consumption function (2) increases.
例如，假设消费函数 (2) 中的常数项 A 增加。

This constant term appears in equation (12) in a position exactly like that of G_0; the effect of its increase will therefore be the same.
这个常数项出现在方程 (12) 中，位置与 G_0 完全相同；因此其增加的效果将是相同的。

The expenditure curve EE will shift to the right by an amount $k\Delta A$, where ΔA is the increase in A.
支出曲线 EE 将向右移动 $k\Delta A$ 的量，其中 ΔA 是 A 的增加量。

The change in equilibrium income will be less than $k\Delta A$, however, for the same reason that it was less than $k\Delta G_0$ before.
然而，均衡收入的变化将小于 $k\Delta A$，原因与之前小于 $k\Delta G_0$ 相同。

This is also true of any other change in expenditure. Since government expenditures have been consolidated into investment in these models, if the government increases expenditures in some form that does not reduce or replace private expenditures of the same kind, there will be an upward shift in the consumption function or in the investment function, as the case may be, by the amount of the government's increased spending.
对于支出的任何其他变化也是如此。由于在这些模型中政府支出已合并到投资中，如果政府以某种不减少或替代同类私人支出的形式增加支出，消费函数或投资函数（视情况而定）将向上移动，移动量为政府增加的支出量。

The expenditure curve will shift to the right by the multiplier times this increase, and the overall effect will be as shown in Figure 13, that is, as implied by equations (12) and (15) combined.
支出曲线将向右移动乘数乘以这一增加量，总体效果将如图 13 所示，即由方程 (12) 和 (15) 结合所暗示的那样。

Similarly, changes in the monetary sector can be analyzed in a straightforward way.
同样，货币部门的变化也可以通过直接的方式进行分析。

Suppose the monetary authorities change their policy in the direction of encouraging a larger money supply and lower...
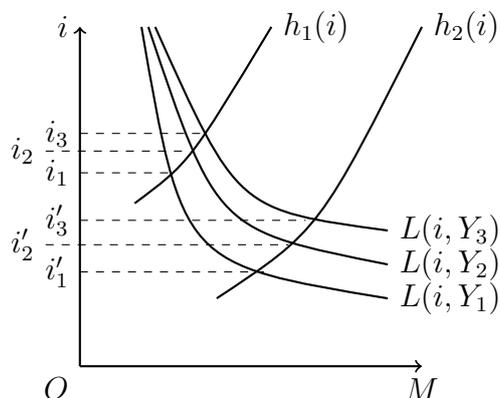
假设货币当局改变其政策，朝着鼓励更大的货币供给和更低的……方向发展。

Figure 14

...rates of interest than previously. This means a shift in the supply curve of money, $h(i)$, to the right, as shown in Figure 14.

……比以前更低的利率。这意味着货币供给曲线 $h(i)$ 向右移动，如图 14 所示。

Under the old policy the intersections of the money supply curve with the family of demand curves $L(i, Y_1), L(i, Y_2), L(i, Y_3), \ldots$ had occurred at $i_1, i_2, i_3, \ldots$, respectively; under the new policy they occur at $i'_1, i'_2, i'_3, \ldots$, instead.

在旧政策下，货币供给曲线与需求曲线族 $L(i, Y_1), L(i, Y_2), L(i, Y_3), \ldots$ 的交点分别出现在 $i_1, i_2, i_3, \ldots$；在新政策下，它们出现在 $i'_1, i'_2, i'_3, \ldots$。

Each of the new interest rates is lower than the old one, for each given level of income; that is, $i'_1 < i_1, i'_2 < i_2, i'_3 < i_3$, and so on.

对于每个给定的收入水平，每个新利率都低于旧利率；即 $i'_1 < i_1, i'_2 < i_2, i'_3 < i_3$，依此类推。

Accordingly the new curve M_2M_2, showing the combinations of the interest rate and income that are consistent with equilibrium in the monetary sector under the new policy, will be below and to the right of the old curve M_1M_1, as shown in Figure 15.

因此，显示新政策下与货币部门均衡一致的利率和收入组合的新曲线 M_2M_2，将位于旧曲线 M_1M_1 的下方和右侧，如图 15 所示。

A tendency to easier money, that is, increased sup-...

宽松货币的趋势，即增加的供……

Figure 15

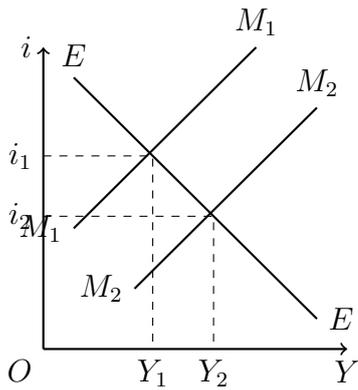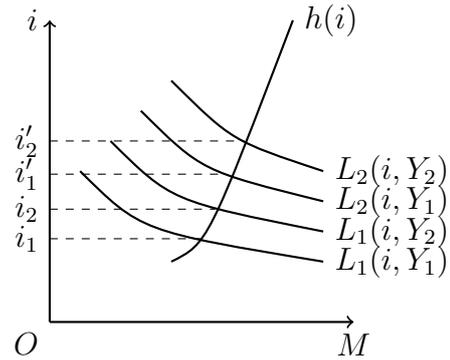**Figure 16**

...plies of money at given interest rates, will shift the MM curve downward and to the right; a tendency to tighter money, that is, reduced supplies of money at given interest rates, will shift the MM curve upward and to the left.
……给（即在给定利率下增加货币供给）将使 MM 曲线向下和向右移动；紧缩货币的趋势（即在给定利率下减少货币供给）将使 MM 曲线向上和向左移动。

The effects of these shifts on the equilibrium values of interest rates and income are also shown in Figure 15.
这些移动对利率和收入均衡值的影响也显示在图 15 中。

The easy money policy, shifting the monetary sector curve from M_1M_1 to M_2M_2, lowers the equilibrium interest rate from i_1 to i_2 and increases the equilibrium level of income from Y_1 to Y_2; a shift of policy to tight money would have the reverse effects.
宽松货币政策将货币部门曲线从 M_1M_1 移动到 M_2M_2，将均衡利率从 i_1 降低到 i_2，并将均衡收入水平从 Y_1 提高到 Y_2；转向紧缩货币政策将产生相反的效果。

The effect of a change in the demand function for cash balances can be found in a similar way. In Figure 16 the demand curves $L_1(i,Y_1), L_1(i,Y_2),\ldots$ have shifted to the new positions $L_2(i,Y_1), L_2(i,Y_2),\ldots$, respectively.
现金余额需求函数变化的影响可以用类似的方法找到。在图 16 中，需求曲线 $L_1(i,Y_1), L_1(i,Y_2),\ldots$ 分别移动到了新位置 $L_2(i,Y_1), L_2(i,Y_2),\ldots$。

This shifts the equilibrium interest rates upward from $i_1, i_2,\ldots$ to $i'_1, i'_2,\ldots$, for the corresponding levels of income Y_1, Y_2, and...
这将对应收入水平 Y_1, Y_2 的均衡利率从 $i_1, i_2,\ldots$ 向上推高到 $i'_1, i'_2,\ldots$，以及……

...so on. Therefore the MM curve is shifted upward and to the left, as it would be if there had been a tightening of monetary policy.
……依此类推。因此，MM 曲线向上和向左移动，就像货币政策紧缩一样。

The effects of the shifts in the demand function for cash balances on the equilibrium values of the interest rate and income are therefore also illustrated by Figure 15.
因此，现金余额需求函数移动对利率和收入均衡值的影响也由图 15 说明。

When the demand curves for cash balances shift upward to the right, as in

Figure 16, the MM curve shifts upward to the left, such as a shift from M_2M_2 to M_1M_1 in Figure 15.
当现金余额需求曲线向上向右移动时（如图 16 所示），MM 曲线向上向左移动，例如图 15 中从 M_2M_2 到 M_1M_1 的移动。

The interest rate rises from i_2 to i_1, and income falls from Y_2 to Y_1.
利率从 i_2 上升到 i_1，收入从 Y_2 下降到 Y_1。

In general, the equilibrium values of the variables in the expenditure sector depend on the monetary sector, and vice versa.
一般来说，支出部门变量的均衡值取决于货币部门，反之亦然。

There is no significant sense in which the equilibrium value of income, or of any other variable, is determined by any one variable or function.
在任何有意义的层面上，收入或任何其他变量的均衡值都不是由任何单一变量或函数决定的。

In particular, it is no longer possible to predict income from knowledge of the investment schedule and the consumption function alone; it cannot be said, as it could in the first simple model considered, that investment determines income.
特别是，不再可能仅凭投资计划表和消费函数的知识来预测收入；不能像在第一个简单模型中那样说投资决定收入。

It is true that an upward shift in the investment function will result in an increase in the equilibrium value of income, but the exact amount of the increase can be known only by taking into account the damping effects of the monetary sector.
确实，投资函数的向上移动将导致均衡收入值的增加，但增加的确切数量只有在考虑货币部门的抑制效应后才能知道。

Similarly, it is still true that saving equals investment at each position of equilibrium.
同样，在每个均衡位置，储蓄仍然等于投资。

Equality between the two no longer depends on variations in income alone, however, but is brought about partly through interactions with the monetary sector.
然而，两者之间的相等不再仅取决于收入的变化，而是部分通过与货币部门的相互作用来实现的。

For example, when the investment schedule shifts upward, we do not observe that income rises to the extent necessary to produce an increase in saving equal to the full shift in the schedule, measured at the old rate of interest; investment comes back part way to meet saving because of the increase in the rate of interest.
例如，当投资计划表向上移动时，我们观察不到收入上升到足以产生等于计划表全部移动量（按旧利率测量）的储蓄增加；由于利率上升，投资回落一部分以满足储蓄。

Equality between saving and investment is brought about by variations both in income and in the rate of interest.
储蓄和投资之间的相等是通过收入和利率的变化共同实现的。

These properties of the model, and of the extended model of sections 9 and 10 below, are characterized as "classical."
该模型的这些性质，以及下文第 9 节和第 10 节扩展模型的性质，被特征化为"古典的"。

The contrasting properties when the demand curve for cash balances is horizontal are characterized as "Keynesian."
当现金余额需求曲线为水平时的对比性质被特征化为"凯恩斯的"。

Certain other cases discussed below, such as that in which the investment function is vertical, also have Keynesian characteristics.
下文讨论的其他某些情况，例如投资函数垂直的情况，也具有凯恩斯特征。

2.8 PROPERTIES OF THE MODEL IN LIMITING CASES
极限情况下模型的性质

The analysis in the preceding two sections is strictly correct only if the functions have the assumed slopes.
前两节的分析只有在函数具有假设斜率的情况下才是严格正确的。

Certain limiting cases that have been the subject of controversy will now be introduced.
现在将介绍某些一直是争议主题的极限情况。

We have already noted, in the preliminary discussion in section 5 on the monetary sector, that it makes no difference to the general properties of the model whether the supply curve of money is positively sloped or is vertical (denoting a fixed supply of money).
我们在第 5 节关于货币部门的初步讨论中已经注意到，货币供给曲线是正斜率还是垂直（表示固定的货币供给），对模型的一般性质没有影响。

Indeed, this supply curve can bend backward (have a negative slope) without affecting these properties, as long as its slope in that case is greater in absolute value than that of any of the demand curves for cash balances, measured with reference to the horizontal axis.
事实上，这条供给曲线甚至可以向后弯曲（具有负斜率）而不影响这些性质，只要在这种情况下，相对于横轴测量的其斜率的绝对值大于任何现金余额需求曲线的斜率。

In contrast, the general properties of the model are affected if the supply curve of money is horizontal, that is, if the monetary authorities create or destroy any amount of money that is necessary to keep the rate of interest fixed.[1]

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[1]This describes the situation when the authorities peg the interest rate that prevails for government securities, as was done during and after the Second World War until 1947, and less firmly thereafter until 1951.

相比之下，如果货币供给曲线是水平的，即如果货币当局为了保持利率固定而创造或销毁任何必要数量的货币，模型的一般性质就会受到影响。[2]

This possibility is illustrated in Figure 17. It is evident that neither changes in income nor shifts of the demand function for money will have any effect on the rate of interest.
这种可能性如图 17 所示。显然，无论是收入的变化还是货币需求函数的移动，都不会对利率产生任何影响。

In this case the MM curve for the monetary sector will also be horizontal, as shown in Figure 18.
在这种情况下，货币部门的 MM 曲线也将是水平的，如图 18 所示。

It will remain that way, at the same rate of interest, as long as the authorities' policy remains unchanged.
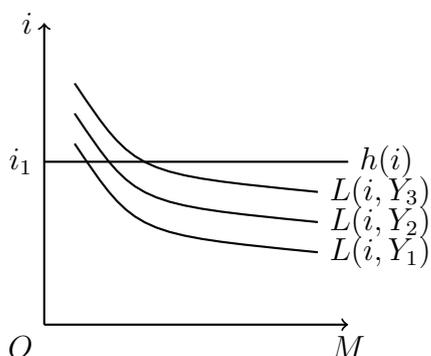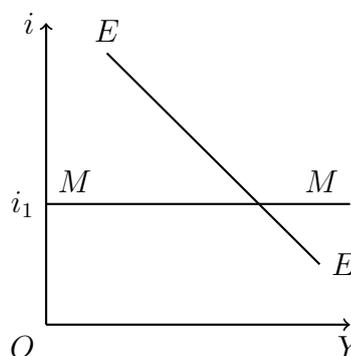只要当局的政策保持不变，它将保持这种状态，维持在同一利率水平。

Figure 17	Figure 18

In this case the properties of the model will be those of the model in which the rate of interest is given and fixed.
在这种情况下，模型的性质将与利率给定且固定的模型的性质相同。

The change in income produced by a shift in an expenditure function—the investment function or the consumption function—will equal the full shift of the EE curve.
由支出函数（投资函数或消费函数）移动产生的收入变化将等于 EE 曲线的全部移动量。

The shift of the EE curve equals $k\Delta G_0$ or $k\Delta A$, as the case may be, so the...
视情况而定，EE 曲线的移动等于 $k\Delta G_0$ 或 $k\Delta A$，所以……

...change in income will be equal to the full multiplier effect of the initial shift in expenditure. Interaction with the monetary sector can be disregarded.
……收入的变化将等于初始支出移动的全部乘数效应。与货币部门的相互作用可以忽略不计。

Essentially the same conclusions follow if the demand curves for cash balances

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[2]这描述了当局钉住政府证券现行利率的情况，正如二战期间及战后直到 1947 年所做的那样，此后直到 1951 年这种做法有所放松。

become horizontal at a single rate of interest high enough to matter.
如果现金余额需求曲线在某个足够高的单一利率水平上变为水平，也会得出基本相同的结论。

(This circumstance is called the "liquidity trap.") If, as illustrated in Figure 19, these curves run together and become horizontal...
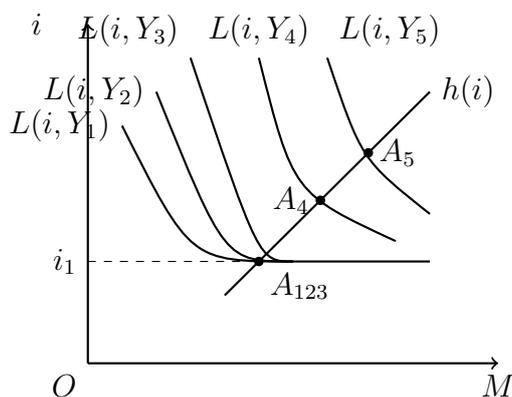（这种情况被称为"流动性陷阱"。）如果如图 19 所示，这些曲线汇合在一起并变为水平……

Figure 19

...at the same rate of interest i_1, at which the supply curve of money cuts the ones that correspond to a certain range of incomes, then for that range of incomes the rate of interest will be fixed.
……在同一利率 i_1 处（货币供给曲线在此处切割对应于一定收入范围的需求曲线），那么对于该收入范围，利率将是固定的。

This is the case for incomes Y_1, Y_2, and Y_3, since $h(i)$ cuts $L(i, Y_1)$, $L(i, Y_2)$, and $L(i, Y_3)$ at A_{123}, at which the rate of interest is i_1.
对于收入 Y_1, Y_2 和 Y_3 来说就是这种情况，因为 $h(i)$ 在 A_{123} 处切割 $L(i, Y_1), L(i, Y_2)$ 和 $L(i, Y_3)$，此时利率为 i_1。

For the higher incomes Y_4, Y_5, and so on, $h(i)$ cuts the corresponding demand curves at A_4 and A_5, at higher rates of interest, so that for these incomes the monetary sector reassumes the characteristics first presented.
对于较高的收入 Y_4, Y_5 等，$h(i)$ 在较高的利率下于 A_4 和 A_5 处切割相应的需求曲线，因此对于这些收入，货币部门重新呈现出最初介绍的特征。

Thus, in Figure 20, if the expenditure sector curve EE cuts MM in...
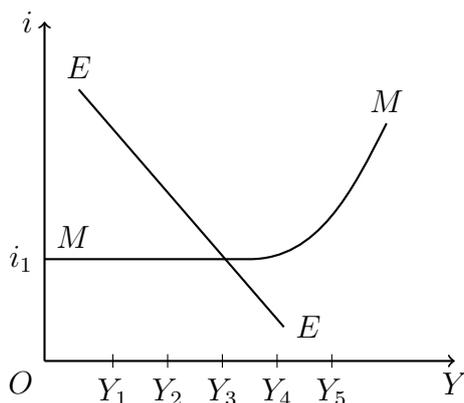因此，在图 20 中，如果支出部门曲线 EE 切割 MM 于……

Figure 20

...the range of incomes below and including Y_3, the rate of interest remains fixed at i_1, and the model has the properties of the simpler model.

……低于及包括 Y_3 的收入范围内，利率保持固定在 i_1，模型具有更简单模型的性质。

For this range of incomes, the multiplier analysis gives exact results.

对于这一收入范围，乘数分析给出了精确的结果。

However, if the expenditure function shifts upward far enough to move EE up into the area where it intersects MM in the range above Y_3, interaction with the monetary sector affects the outcome, and the analysis of the preceding two sections becomes applicable.

然而，如果支出函数向上移动得足够远，使 EE 向上移动到它与 MM 在 Y_3 以上范围内相交的区域，与货币部门的相互作用就会影响结果，前两节的分析就变得适用了。

When the situation is strictly as shown, it will also be true that changes in monetary policy will have no effect as long as the EE curve continues to cut the MM curve in its horizontal part.

当情况严格如所示时，只要 EE 曲线继续在 MM 曲线的水平部分与之相交，货币政策的变化也将没有影响。

If the supply curve of money $h(i)$ is shifted to the right, in Figure 19, the range of incomes will be increased for which $h(i)$ cuts the demand curves for money in their horizontal sections.

如果在图 19 中，货币供给曲线 $h(i)$ 向右移动，那么 $h(i)$ 在其水平部分切割货币需求曲线的收入范围将会增加。

This will shift to the right the rising section of the monetary sector curve, extending the horizontal part as shown in Figure 21.

这将使货币部门曲线的上升部分向右移动，延长水平部分，如图 21 所示。

A change to an easier monetary policy, shifting $h(i)$ in Figure 19 to the right, shifts the monetary sector curve in Figure 21 from M_1M_1 to M_2M_2; a change to a tighter monetary policy will have the reverse effect.

转向更宽松的货币政策（将图 19 中的 $h(i)$ 向右移动），会使图 21 中的货币部门曲线从 M_1M_1 移动到 M_2M_2；转向更紧缩的货币政策将产生相反的效果。

Neither change will have any effect on the equilibrium income and rate of interest, as long as the expenditure sector curve EE cuts the monetary sector curve in its horizontal section.
只要支出部门曲线 EE 在货币部门曲线的水平部分与之相交，这两种变化都不会对均衡收入和利率产生任何影响。

Another special case occurs if investment is completely insensitive to the interest rate.
如果投资对利率完全不敏感，就会出现另一种特殊情况。

If, as in Figure 22, the investment schedule is a vertical line (that is, $G_1 = 0$), indicating that investment will be constant at G_0 regardless of the interest rate, the equilibrium value of income also will be constant.
如果如图 22 所示，投资计划表是一条垂直线（即 $G_1 = 0$），表明无论利率如何，投资都将恒定为 G_0，那么收入的均衡值也将是恒定的。

$$Y_1 = \frac{a + G_0}{1 - b}$$
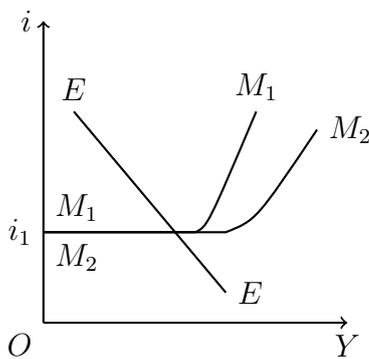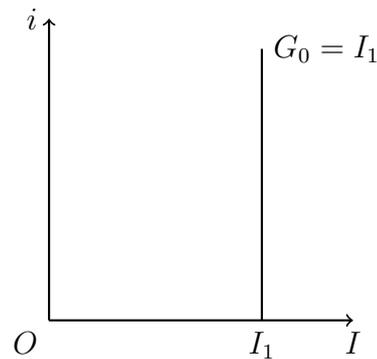

Figure 21

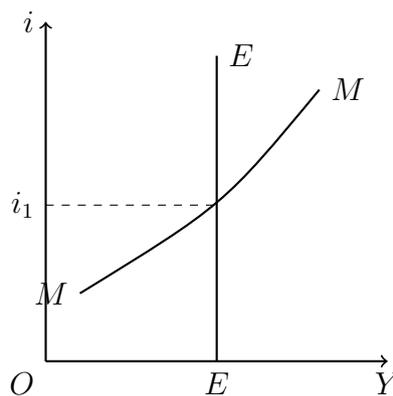**Figure 22**

Figure 23

Accordingly, the EE curve will be a vertical line over Y_1, as shown in Figure 23.
因此，EE 曲线将在 Y_1 上方成为一条垂直线，如图 23 所示。

The interest rate can be said to depend on interaction between the expenditure sector and the monetary sector, in this case, but income does not.

在这种情况下，可以说利率取决于支出部门和货币部门之间的相互作用，但收入却不是。

Neither a change in monetary policy nor any other change in the monetary sector will affect the equilibrium value of income but will only change the interest rate.
无论是货币政策的变化还是货币部门的任何其他变化，都不会影响收入的均衡值，而只会改变利率。

In this case also the multiplier analysis applies exactly; any shift in an expenditure functon will increase income by the full shift in the EE curve, as given by the multiplier.
在这种情况下，乘数分析也完全适用；支出函数的任何移动都将使收入增加 EE 曲线的全部移动量（由乘数给出）。

The interest rate will rise or fall, according to whether the shift is to the right or to the left, but income is unaffected by this rise or fall.
利率将根据移动是向右还是向左而上升或下降，但收入不受这种上升或下降的影响。

2.9   THE PRICE LEVEL
价格水平

Up to this point we have assumed that the price level is given and constant.
到目前为止，我们一直假设价格水平是既定且恒定的。

On this assumption, the number of equations has been exactly enough to determine all the unknowns, except in special cases.
在此假设下，方程的数量恰好足以确定所有未知数，特殊情况除外。

If the price level is considered an undetermined variable, the model is incomplete.
如果价格水平被认为是一个未确定的变量，那么模型就是不完整的。

Now let us consider in detail how the model is modified by the introduction of the price level as a variable.
现在让我们详细考虑一下，引入价格水平作为变量后，模型是如何被修正的。

We assume that when the price level changes all prices change in the same proportion.
我们假设当价格水平变化时，所有价格都按相同比例变化。

This is not strictly accurate, since changes in other variables affect relative prices; for example, a change in the rate of interest will among other things imply changes in the prices of capital-intensive goods relative to labor-intensive ones.
这并不严格准确，因为其他变量的变化会影响相对价格；例如，利率的变化除其他外，将意味着资本密集型商品相对于劳动密集型商品的价格发生变化。

Effects of this kind are immaterial to the problems and issues to be considered

here, however, and will be disregarded.
然而，这类影响对这里要考虑的问题和议题无关紧要，将被忽略。

We shall also suppose that contracts, pensions, and other assets and income flows normally thought of as fixed in money terms are all adjusted proportionately with the price level, so that there are no distributional effects.
我们还将假设合同、养老金以及通常被认为以货币形式固定的其他资产和收入流，都随价格水平成比例调整，因此不存在分配效应。

Consider first the equations of the expenditure sector. There is no reason, as a first approximation, to suppose that the relationship between consumption and income will be affected by the price level.
首先考虑支出部门的方程。作为初步近似，没有理由假设消费和收入之间的关系会受到价格水平的影响。

Since by assumption all prices, contract incomes, and so on change in the same proportion, the bill of goods each household can command and can expect to command in the future will be entirely unaffected.
由于假设所有价格、合同收入等都按相同比例变化，每个家庭能够支配以及预期在未来能够支配的商品清单将完全不受影响。

It is reasonable to suppose, therefore, that each household will make the same allocation of income as before between current consumption and saving in real terms, if real income is unchanged.
因此，有理由假设，如果实际收入不变，每个家庭将在实际消费和储蓄之间做出与以前相同的收入分配。

Accordingly, we write
因此，我们写道

$$c = a + by \tag{16}$$

where lowercase letters represent real (deflated) counterparts to the current values previously expressed with capital letters.
其中小写字母代表之前用大写字母表示的当前价值的实际（平减后）对应物。

$$c = \frac{C}{P} \quad a = \frac{A}{P} \quad y = \frac{Y}{P}$$

Equation (16) expresses the consumption function explicitly in real terms.
方程 (16) 明确地以实际项表达了消费函数。

When the price level changes, the quantities C, A, and Y, which are expressed as money values per unit time, will change in the same proportion, since the price of everything included in each of them will have changed in the same proportion.
当价格水平变化时，表示为每单位时间货币价值的数量 C, A 和 Y 将按相同比例变化，因为它们各自包含的所有东西的价格都将按相同比例变化。

Hence the ratios C/P, A/P, and Y/P will be invariant for changes in the price level, when the real quantities are unchanged.[3]

因此，当实际数量不变时，比率 $C/P, A/P$ 和 Y/P 对于价格水平的变化将保持不变。[4]

Similar considerations apply to investment. Under the assumed conditions there is no reason to suppose either that the expected rate of profit or the risk connected with any investment will be changed by changes in the price level.

类似的考虑也适用于投资。在假设条件下，没有理由假设预期利润率或与任何投资相关的风险会因价格水平的变化而改变。

(This is contingent also on the assumption about expectations made below.) Accordingly, the willingness of firms, financial intermediaries, and households to borrow and lend for productive investment will not be affected, and we can write

（这也取决于下面所做的关于预期的假设。）因此，企业、金融中介机构和家庭为生产性投资借贷的意愿将不会受到影响，我们可以写道

$$z = g_0 + g_1 i \tag{17}$$

where $z = \frac{I}{P}$, $g_0 = \frac{G_0}{P}$, $g_1 = \frac{G_1}{P}$.

其中 $z = \frac{I}{P}, g_0 = \frac{G_0}{P}, g_1 = \frac{G_1}{P}$。

Again a change in P carries with it a change in every element of I in the same proportion; the ratio I/P is invariant with respect to the price level, as long as the physical quantities in it are unchanged.

同样，P 的变化伴随着 I 的每个要素按相同比例变化；只要其中的实物数量不变，比率 I/P 相对于价格水平就是不变的。

The accounting identity for national income remains an identity when each of its components is divided by the same number, so that

当国民收入的每个组成部分都除以相同的数时，国民收入的会计恒等式仍然是恒等式，所以

$$y = \frac{Y}{P} = \frac{C+I}{P} = c + z \tag{18}$$

automatically holds for every price level.

对每个价格水平自动成立。

In contrast to equation (18), writing equations (16) and (17) as we did involves more than the formal operation of dividing the value magnitudes in the corresponding equations (2) and (11) by the price index P.

---

[3]Since the constant A was first introduced as a magnitude expressed in money terms, consistency requires that it be converted to real terms. The same is true of G_0 and G_1, in (17).

[4]由于常数 A 最初是作为以货币形式表示的量引入的，一致性要求将其转换为实际形式。对于 (17) 中的 G_0 和 G_1 也是如此。

与方程 (18) 相反，像我们那样写出方程 (16) 和 (17)，不仅仅是将对应方程 (2) 和 (11) 中的价值量除以价格指数 P 的形式操作。

It implies that the same real quantities will always satisfy the relationships indicated, that is, that households and firms will continue to buy the same physical quantities of all goods and services, whatever the price level, for any given interest rate.
它意味着相同的实际数量将总是满足所指示的关系，即无论价格水平如何，对于任何给定的利率，家庭和企业将继续购买相同实物数量的所有商品和服务。

Equation (18) would be true whether the others were accurate descriptions of behavior or not.
无论其他方程是否准确描述了行为，方程 (18) 都是正确的。

In the monetary sector we must make an assumption about the prevailing expectation of the future course of the price level.
在货币部门，我们必须对价格水平未来走势的普遍预期做出假设。

For simplicity in the present context we assume that everyone expects the price level to remain where it is.
为了在当前背景下简化，我们假设每个人都预期价格水平保持在现有水平。

Whether the price level doubles or falls by half, we assume that people expect it to remain at its new level indefinitely.
无论价格水平翻倍还是减半，我们都假设人们预期它将无限期地保持在新水平。

When this is true, it is reasonable to suppose that households and firms regard the quantity of goods and services that a given cash balance will command in the same light as any other real or physical quantity.
当这成立时，有理由假设家庭和企业将给定现金余额所能支配的商品和服务数量，视为与任何其他实际或实物数量一样。

The reasons for holding cash, including both routine payments and possible unexpected outlays, will rise in money value in direct proportion to the price level.
持有现金的理由，包括日常支付和可能的意外支出，其货币价值将与价格水平成正比上升。

The cash that is necessary or desirable to hold for all contingencies for given real income and wealth will rise in the same proportion as the price level.
对于给定的实际收入和财富，为应对所有意外情况而必须或希望持有的现金，将与价格水平按相同比例上升。

This means that we can write
这意味着我们可以写道

$$m = \frac{M}{P} = L(i, y) \tag{19}$$

This demand function is analogous to the new versions of the consumption and investment functions, equations (16) and (17).
这个需求函数类似于消费和投资函数的新版本，即方程 (16) 和 (17)。

As in those equations, if the price level is changed and if the real magnitudes involved remain the same, equation (19) will continue to be satisfied; M demanded will rise in the same proportion as the price level when real income and i remain constant.
正如在那些方程中一样，如果价格水平改变且涉及的实际量保持不变，方程 (19) 将继续得到满足；当实际收入和 i 保持不变时，需求的 M 将与价格水平按相同比例上升。

Concerning the supply of money, it is less easy to specify its behavior with changes in the price level.
关于货币供给，要具体说明其随价格水平变化的行为就不那么容易了。

There are several possible ways the monetary authorities might respond to changes in the price level, and
货币当局对价格水平变化可能有几种反应方式，并且……

there is little clear evidence on what they do. The simplest assumption, which will serve adequately for now, is that the authorities hold constant the supply curve of cash balances in nominal terms; that is, in effect they do not react in any way to unsystematic changes in the price level.
关于他们（货币当局）做什么，几乎没有明确的证据。目前足够充分的最简单假设是，当局保持名义现金余额供给曲线不变；也就是说，实际上他们不对价格水平的非系统性变化做出任何反应。

Stated differently, a given upward shift in the demand for cash will bring forth the same responses from the monetary institutions and authorities whether the shift is due to a rise in real income with prices constant or to a rise in the price level with real income constant.
换句话说，无论是由于价格不变时实际收入的增加，还是由于实际收入不变时价格水平的上升，现金需求的给定向上移动都会引起货币机构和当局相同的反应。

(Even if this is only approximately correct, the accuracy of our main analysis will not be affected.) In this case we keep the supply equation
（即使这只是近似正确，我们主要分析的准确性也不会受到影响。）在这种情况下，我们保留供给方程

$$M = h(i) \tag{14}$$

and divide both sides by P in order to have the same variable on the left as in equation (19).
并将两边除以 P，以便左边具有与方程 (19) 相同的变量。

$$m = \frac{1}{P}h(i) \tag{20}$$

The equations representing the model of income determination are now the following:

现在代表收入决定模型的方程如下：

$$
\begin{aligned}
c &= a + by \\
z &= g_0 + g_1 i \\
y &= c + z \\
m &= L(i, y) \\
m &= \frac{1}{P} h(i)
\end{aligned}
\quad , (17), (18), (19), (20)
\tag{16}
$$

In place of the previous variables C, Y, I, i, and M, we now have the variables c, y, z, i, and m, respectively, and in addition, since P appears on the right-hand side of (20), we have P as a separate variable. Thus we have six variables and only five equations.

代替之前的变量 C, Y, I, i 和 M，我们现在分别有变量 c, y, z, i 和 m，此外，由于 P 出现在 (20) 的右侧，我们有 P 作为一个单独的变量。因此我们有六个变量，但只有五个方程。

Since the price level does not affect the equations of the expenditure sector, which contain real variables and the interest rate only, this sector combines as before into a single equation in the two variables, real income and the interest rate.

由于价格水平不影响支出部门的方程（该部门仅包含实际变量和利率），因此该部门像以前一样合并为一个关于实际收入和利率这两个变量的单一方程。

$$
y = \frac{a + g_0 + g_1 i}{1 - b}
\tag{21}
$$

The monetary sector, however, simplifies into one equation in three variables, namely, real income, the interest rate, and the price level.

然而，货币部门简化为一个包含三个变量（即实际收入、利率和价格水平）的方程。
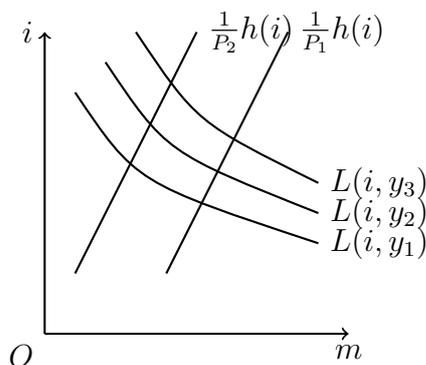
$$
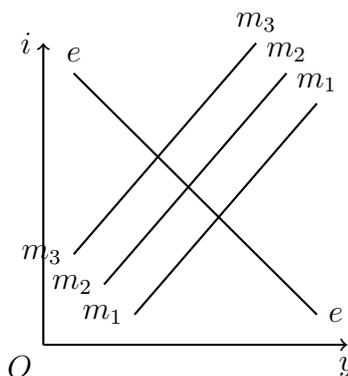\frac{1}{P} h(i) = L(i, y)
\tag{22}
$$

Figure 24

Figure 25

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The monetary sector, under the present assumptions, is illustrated in Figure 24. The horizontal axis now measures real cash balances m, rather than nominal cash balances.

在当前假设下，货币部门如图 24 所示。横轴现在衡量实际现金余额 m，而不是名义现金余额。

The demand function for real cash balances is the same as before, with a different curve for each level of real income.

实际现金余额的需求函数与以前相同，每个实际收入水平对应一条不同的曲线。

It is now necessary, however, to draw the supply function of money as a family of curves, instead of only one curve. Each curve corresponds to a different price level, as indicated, where $P_2 > P_1$.

然而，现在有必要将货币供给函数画成一组曲线，而不是仅画一条曲线。每条曲线对应不同的价格水平，如所示，其中 $P_2 > P_1$。

It can be seen that a rise in the price level from P_1 to P_2 has the same general effect on the supply of real cash balances as would a shift to tighter monetary policy at a constant price level.

可以看出，价格水平从 P_1 上升到 P_2，对实际现金余额供给的一般影响，与价格水平不变时转向紧缩货币政策的影响相同。

The shift to the left of $(1/P)h(i)$, because of the rise in the price level, raises the interest rate at which it intersects with each of the demand curves for real cash balances.

由于价格水平上升导致 $(1/P)h(i)$ 向左移动，提高了它与每条实际现金余额需求曲线相交时的利率。

Therefore, the curve representing equilibrium in the monetary sector, relating the interest rate to real income, is shifted to the left.

因此，代表货币部门均衡（将利率与实际收入联系起来）的曲线向左移动。

This is illustrated in Figure 25. For each price level, P_1, P_2, P_3, there will be a different monetary sector curve, m_1m_1, m_2m_2, and m_3m_3, respectively.

这在图 25 中说明。对于每个价格水平 P_1, P_2, P_3，将分别有一条不同的货币部门曲线 m_1m_1, m_2m_2 和 m_3m_3。

The expenditure sector curve, representing equation (21), is a single curve ee as before.

代表方程 (21) 的支出部门曲线，像以前一样是一条单一曲线 ee。

The combination of the monetary and expenditure sectors no longer determines a single value each for the rate of interest and income.

货币部门和支出部门的结合不再为利率和收入各确定一个单一值。

Depending on the price level any combination of the rate of interest and income along the expenditure sector curve can be consistent with simultaneous equilibrium in both sectors, and the price level is indeterminate.

取决于价格水平，沿着支出部门曲线的利率和收入的任何组合都可以与两个部门的同时均衡相一致，此时价格水平是不确定的。

2.10 THE PRODUCTION-EMPLOYMENT SECTOR
生产-就业部门

The model is indeterminate with the price level as a variable, because it is incomplete.
以价格水平为变量的模型是不确定的，因为它是未完成的。

We get a complete enough model for addressing the major issues of national income determination when we introduce the sector relating employment and real wages to national income and product.
当我们引入将就业和实际工资与国民收入和产出联系起来的部门时，我们就得到了一个足以解决国民收入决定主要问题的完整模型。

For the present, we assume that employment is related in a simple and direct way to production, such that the two rise and fall together and such that employment is always the same at any given level of production, and vice versa.
目前，我们假设就业与生产有着简单直接的联系，两者同升同降，并且在任何给定的生产水平上就业总是相同的，反之亦然。

Recalling that income always equals production, we write
回顾收入总是等于生产，我们写道

$$y = f(N) \tag{23}$$

where N represents total employment. The function $f(N)$ is a simplified version of the production function; it is an aggregate of the corresponding functions for individual firms.
其中 N 代表总就业。函数 $f(N)$ 是生产函数的简化版本；它是单个企业相应函数的总和。

We further assume that hiring by firms is competitive, so that each firm will hire up to the point at which the real wage is equal to the marginal product of labor
我们进一步假设企业的招聘是竞争性的，因此每个企业都会招聘直到实际工资等于劳动的边际产品

$$w = f'(N) \tag{24}$$

where w is the real wage rate and where $f'(N)$, the first derivative of the production function, is labor's marginal product in generalized units of product.
其中 w 是实际工资率，$f'(N)$（生产函数的一阶导数）是以广义产品单位表示的劳动边际产品。

Finally, we assume that the supply of labor can be expressed as a simple function of the real wage
最后，我们假设劳动力供给可以表示为实际工资的简单函数

$$N = j(w) \tag{25}$$

This means either that labor is supplied competitively or where it is not the demand curve it faces shifts in such a way as to give a simple relation between the real wage and the quantity of employment.
这意味着要么劳动力是竞争性供给的，要么在非竞争性供给的情况下，它所面临的需求曲线移动的方式使得实际工资与就业数量之间存在简单的关系。

The three equations of the production and employment sector appear in Figure 26(a) and (b).
生产和就业部门的三个方程出现在图 26(a) 和 (b) 中。

In Figure 26(a) we have the supply and demand curves for labor. The supply curve is drawn backward-bending,
在图 26(a) 中，我们有劳动的供给和需求曲线。供给曲线被画成向后弯曲的，
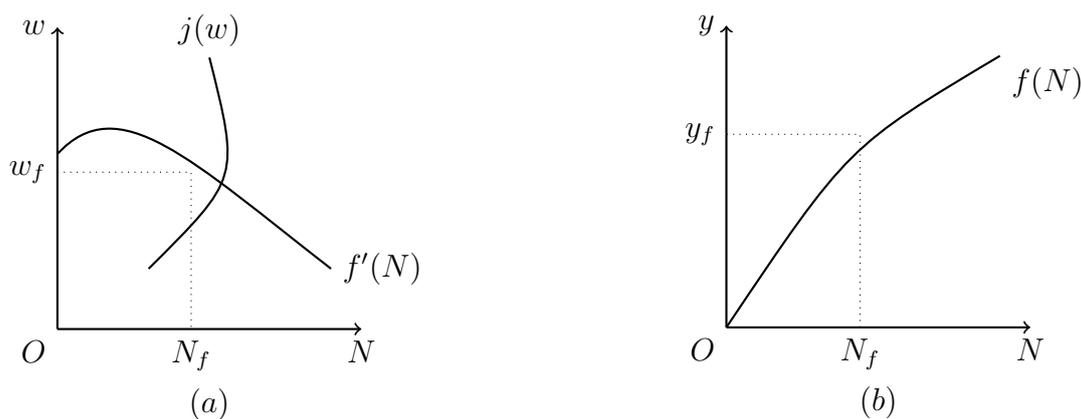
Figure 26

although it does not necessarily have this characteristic.
尽管它不一定具有这种特征。

The demand curve, that is, the marginal-productivity curve, slopes downward in the relevant parts of its range.
需求曲线，即边际生产力曲线，在其相关范围内向下倾斜。

Their intersection determines that real wage w_f and that level of employment N_f which correspond to equilibrium in the labor market, that is, to full employment.
它们的交点决定了对应于劳动力市场均衡（即充分就业）的实际工资 w_f 和就业水平 N_f。

Carrying N_f into part (b) of Figure 26, we obtain from the production function $f(N)$ the level of real income and production y_f that corresponds to full

employment.
将 N_f 带入图 26 的 (b) 部分，我们从生产函数 $f(N)$ 获得了对应于充分就业的实际收入和生产水平 y_f。

The solutions are final, because the three equations (23) to (25) contain only three variables.
这些解是最终的，因为三个方程 (23) 到 (25) 只包含三个变量。

The two equations (24) and (25) determine their two variables, including the full-employment level of employment; this result, introduced into equation (23), gives full-employment real income.
两个方程 (24) 和 (25) 确定了它们的两个变量，包括充分就业的就业水平；将此结果引入方程 (23)，给出了充分就业实际收入。

Full-employment real income is a constant with respect to the variables in the expenditure and monetary sectors and in particular with respect to the rate of interest.
充分就业实际收入相对于支出部门和货币部门的变量，特别是相对于利率而言，是一个常数。

We introduce this result into the diagram representing those two sectors by using a vertical line over full-employment real income, in Figure 27.
我们在图 27 中，通过在充分就业实际收入上方使用一条垂直线，将此结果引入代表这两个部门的图表中。

The curves for the other sectors duplicate those in Figure 25.
其他部门的曲线复制了图 25 中的曲线。
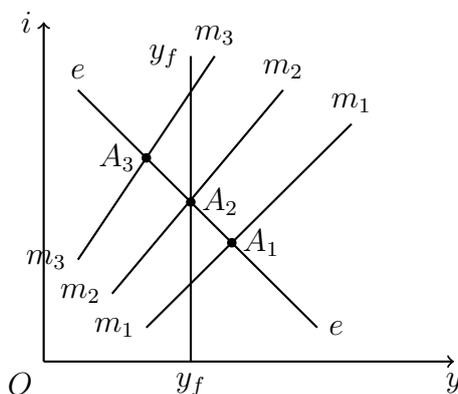
Figure 27

The model combining all three sectors is fully determinate, except in limiting cases such as those mentioned in section 8; there is only one price level at which the monetary and expenditure sectors can be in simultaneous equilibrium at the full-employment level of real income.
除了第 8 节提到的极限情况外，结合所有三个部门的模型是完全确定的；只有一个价格水平能使货币部门和支出部门在充分就业实际收入水平上同时处于均衡。

When the relationships are shown in Figure 27, that price level is P_2.
当关系如图 27 所示时，该价格水平为 P_2。

At the lower price level P_1, the monetary sector curve m_1m_1 intersects the expenditure sector curve at the point A_1, at which income is higher than the full-employment level.
在较低的价格水平 P_1 下，货币部门曲线 m_1m_1 与支出部门曲线相交于点 A_1，此时收入高于充分就业水平。

This implies that the price level will rise; and since there is only one equilibrium level for real wages, money wages will rise in step with the price level.
这意味着价格水平将上升；由于实际工资只有一个均衡水平，名义工资将随价格水平同步上升。

[It can be seen in Figure 26(a) that when the prices of consumption and investment goods and services rise, lower-...
（在图 26(a) 中可以看出，当消费和投资商品及服务的价格上涨时，降低……

...ing real wages, the demand for labor will exceed its supply; this implies a rise in money wages.] Equilibrium will prevail throughout the system when the price level reaches P_2.
……实际工资，劳动力需求将超过其供给；这意味着名义工资上涨。）当价格水平达到 P_2 时，整个系统将普遍达到均衡。

At the higher price level P_3, the monetary sector curve m_3m_3 intersects the expenditure sector curve at the point A_3, at which income is lower than the full-employment level and the interest rate is higher.
在较高的价格水平 P_3 下，货币部门曲线 m_3m_3 与支出部门曲线相交于点 A_3，此时收入低于充分就业水平，利率较高。

At this point aggregate demand is less than the aggregate supply of goods and services. The price level will tend to fall, including money wages. Both will continue to fall until equilibrium prevails at the price level P_2.
此时总需求小于商品和服务的总供给。价格水平（包括名义工资）将趋于下降。两者将继续下降，直到在价格水平 P_2 处达到均衡。

In summary, the equations of the model of national income determination are the following:
综上所述，国民收入决定模型的方程如下：

The expenditure sector:
支出部门：

$$c = a + by$$
$$z = g_0 + g_1 i, (17), (18) \tag{16}$$
$$y = c + z$$

The monetary sector:
货币部门：

$$m = L(i, y)$$

$$m = \frac{1}{P}h(i) \quad , \quad (20)$$ (19)

The production-employment sector:
生产-就业部门：

$$y = f(N)$$

$$w = f'(N), (24), (25)$$ (23)

$$N = j(w)$$

Each of the sectors can be collapsed into a single equation in two, three, and one variable(s), respectively.
每个部门可以分别合并为一个包含两个、三个和一个变量的单一方程。

The expenditure sector:
支出部门：

$$y = \frac{a + g_0 + g_1 i}{1 - b}$$ (21)

The monetary sector:
货币部门：

$$\frac{1}{P}h(i) = L(i, y)$$ (22)

The production-employment sector:
生产-就业部门：

$$y = f(N_f) = y_f$$ (26)

These three equations are the curves in Figure 27.
这三个方程就是图 27 中的曲线。

2.11 ECONOMIC LINKS BETWEEN SECTORS
部门间的经济联系

Consider an apparent puzzle in the properties of the complete model.
考虑完整模型性质中一个明显的谜题。

We have noted that only real variables, and not the price level or the quantity of real cash balances, appear in the equations of the expenditure sector and of the production-employment sector.

我们已经注意到，只有实际变量，而没有价格水平或实际现金余额数量，出现在支出部门和生产-就业部门的方程中。

The price level and real cash balances appear as variables only in the monetary sector equations.
价格水平和实际现金余额仅作为变量出现在货币部门方程中。

The price level, however, is made up of the prices of current goods and services in the expenditure sector; a disequilibrium in the price level must be corrected by changes in these prices.
然而，价格水平是由支出部门中当前商品和服务的价格构成的；价格水平的不均衡必须通过这些价格的变化来纠正。

If the price level is not a variable in the expenditure sector, how can there be a tendency toward equilibrium in the price level?
如果价格水平不是支出部门的变量，价格水平怎么会有趋向均衡的趋势呢？

More particularly, if a given combination of the interest rate and real income is consistent with the expenditure sector regardless of the price level, a change in the price level does not disturb the consistency of this combination; similarly, if a given combination of the interest rate and real income that is inconsistent with the expenditure sector remains inconsistent regardless of any change in the price level.
更具体地说，如果利率和实际收入的给定组合无论价格水平如何都与支出部门一致，那么价格水平的变化就不会扰乱这种一致性；同样，如果利率和实际收入的给定组合与支出部门不一致，那么无论价格水平如何变化，它仍然不一致。

If the price level does not affect these relationships in the expenditure sector, how can the expenditure sector affect the price level?
如果价格水平不影响支出部门的这些关系，支出部门又如何影响价格水平呢？

This puzzle disappears, however, when we note that each market in the expenditure sector and the production-employment sector drives its price and so affects the price level.
然而，当我们注意到支出部门和生产-就业部门的每个市场都驱动其价格从而影响价格水平时，这个谜题就消失了。

At a rate of interest below its equilibrium value, every such market might have unsatisfied demand, and every price would rise.
在低于其均衡值的利率下，每个这样的市场都可能有未满足的需求，每个价格都会上涨。

When every price rises, however, every demand curve and supply curve shifts upward, so that their intersection runs away from the price as fast as it rises, unless the interest rate changes.
然而，当每个价格上涨时，每条需求曲线和供给曲线都会向上移动，因此除非利率改变，否则它们的交点会随着价格上涨而快速远离价格。

The interest rate does change, because the rise in the price level increases the interest rate that balances supply with demand in the monetary sector.

利率确实会改变，因为价格水平的上升提高了货币部门供需平衡时的利率。

This reaction through the monetary sector cuts back the upward shift in the demand curve for each good and service, so that its price closes the gap to the intersection of the demand curve and supply curve.
这种通过货币部门的反应削减了每种商品和服务需求曲线的向上移动，使其价格缩小了与需求曲线和供给曲线交点之间的差距。

Thus the expenditure sector and the production-employment sector drive the price level, through ordinary demand-supply relationships, even though a proportionate change in every price leaves every excess demand where it was until and unless the interest rate changes.
因此，支出部门和生产-就业部门通过普通的供需关系驱动价格水平，即使每个价格的成比例变化会使每个超额需求保持原样，直到且除非利率发生变化。

The change in the interest rate comes from the monetary sector, in reaction to the change in the price level.
利率的变化来自货币部门，是对价格水平变化的反应。

The transition to equilibrium involves a series of interactions among all three sectors, if we choose to view it as a sequence analogous to that in the development of the multiplier.
如果我们选择将其视为类似于乘数发展过程的序列，那么向均衡的过渡涉及所有三个部门之间的一系列相互作用。

With a price level that is initially too low, the monetary sector produces an interest rate that is too low for equilibrium in the other sectors: desired expenditures exceed available...
如果初始价格水平太低，货币部门会产生一个对于其他部门均衡来说太低的利率：期望支出超过可用的……

supplies and resources, whose prices therefore rise.
供给和资源，因此其价格上涨。

The price level rises, and the monetary sector now produces an interest rate that is closer to the equilibrium one than before: the excess of desired expenditures over supplies and resources is less than previously.
价格水平上涨，货币部门现在产生的利率比以前更接近均衡利率：期望支出超过供给和资源的过剩量比以前减少了。

The price level continues to rise until it reaches the equilibrium level.
价格水平继续上涨，直到达到均衡水平。

The appearance of paradox or puzzle comes from a difference between the mathematical interpretation and the economic interpretation of the model.
悖论或谜题的出现源于模型的数学解释和经济解释之间的差异。

Mathematically, the expenditure sector and the production-employment sector determine the interest rate and have nothing to do with the price level,

which does not appear as a variable in their equations.
在数学上，支出部门和生产-就业部门决定了利率，与价格水平无关，价格水平不作为变量出现在它们的方程中。

Mathematically, the monetary sector has the interest rate given by the other two sectors and, subject to this rate, determines the quantity of money and the price level.
在数学上，货币部门接受其他两个部门给定的利率，并在此利率下决定货币数量和价格水平。

Economically, however, the expenditure sector and the production-employment sector help determine the prices of their goods and services.
然而，在经济上，支出部门和生产-就业部门有助于决定其商品和服务的价格。

The model fails to reflect this economic aspect of these sectors because it aggregates the markets for goods and services and disregards individual prices.
模型未能反映这些部门的这一经济方面，因为它汇总了商品和服务市场，忽略了单个价格。

In a parallel way, economically the monetary sector acts on the interest rate, which is the price that equates supply and demand for cash balances as a part of the economy's portfolio.
类似地，在经济上，货币部门作用于利率，利率是作为经济投资组合一部分的现金余额供需平衡的价格。

But just as the price level that the nonmonetary sectors set for goods and services depends on the interest rate, so also the interest rate that the monetary sector sets depends on the price level.
但是，正如非货币部门为商品和服务设定的价格水平取决于利率一样，货币部门设定的利率也取决于价格水平。

The interest rate it "determines" is driven by the price level to the full-employment rate, given by the other two sectors.
它"决定"的利率受价格水平驱动，趋向于由其他两个部门给定的充分就业利率。

This interaction reconciles the mathematical and economic interpretations of the model.
这种相互作用调和了模型的数学解释和经济解释。

2.12　COMPARATIVE STATICS OF NATIONAL INCOME
国民收入的比较静态分析

The national income model assembled in the preceding sections, as it stands, is probably the most enlightening and generally applicable representation of the economy among the many that have come into use.
前几节汇编的国民收入模型，就其现状而言，可能是众多投入使用的模型中最具启发性和普遍适用性的经济表述。

It is important to acquire a good grasp of its characteristics and implications.
很好地掌握其特征和含义是很重要的。

Not only does it have a very general usefulness in and of itself, but it provides a good point of departure for the analysis of more complicated or specialized questions than the model itself can answer.
它不仅本身具有非常普遍的用途，而且为分析比模型本身能回答的更复杂或更专业的问题提供了一个良好的出发点。

The model shows what happens to the equilibrium values of different variables when some function shifts.
该模型显示了当某些函数移动时，不同变量的均衡值会发生什么变化。

This use of it is comparative statics, so called because it involves the comparison of different static positions of equilibrium.
这种用法被称为比较静态分析，之所以这样称呼，是因为它涉及比较不同的静态均衡位置。

Our analysis has used comparative statics throughout, and we shall consider four more examples now, with the complete model.
我们的分析自始至终都在使用比较静态分析，现在我们将用完整模型再考虑四个例子。

2.12.1 A SHIFT OF A FUNCTION IN THE EXPENDITURE SECTOR
支出部门函数的移动

Suppose that either the consumption function or the investment function shifts upward, so that at any given rate of interest expenditure is higher than before.
假设消费函数或投资函数向上移动，使得在任何给定利率下支出都比以前高。

We have seen that this implies a shift to the right of the aggregate expenditure function, as illustrated in Figure 28, from e_1e_1 to e_2e_2, where the shift equals the product of the multiplier times the shift in the consumption or investment function.
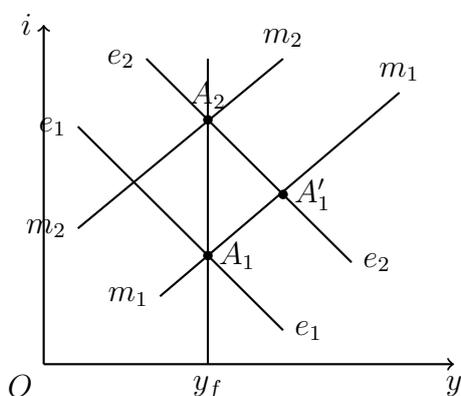我们已经看到，这意味着总支出函数向右移动，如图 28 所示，从 e_1e_1 移动到 e_2e_2，其中移动量等于乘数乘以消费或投资函数的移动量。

Figure 28

The result of this shift is that the new expenditure sector curve intersects the monetary sector curve at A_1' instead of A_1, at a greater than full-employment level of real income; thus the price level is below its equilibrium level.

这种移动的结果是，新的支出部门曲线与货币部门曲线相交于 A_1' 而不是 A_1，处于高于充分就业的实际收入水平；因此价格水平低于其均衡水平。

As noted in the preceding section, the price level will rise, shifting the monetary sector curve from m_1 to m_2, so that it intersects the expenditure sector curve at the full-employment level of real income, at A_2.

正如上一节所述，价格水平将上升，将货币部门曲线从 m_1 移动到 m_2，使其与支出部门曲线在充分就业实际收入水平 A_2 处相交。

Now the interest rate and the price level are higher than before.

现在利率和价格水平都比以前高。

If the upward expenditure shift was in investment, consumption is the same as before, as real income is unchanged (and we have assumed that consumption depends only on income, not on the interest rate).

如果向上的支出移动发生在投资上，消费与以前相同，因为实际收入不变（且我们假设消费仅取决于收入，而不取决于利率）。

Therefore, since saving equals investment both before and after the shift and since saving is unchanged, investment is unchanged; the rise in the rate of interest chokes investment back to its old level, fully offsetting the upward shift in the investment function.

因此，由于储蓄在移动前后都等于投资，且储蓄不变，所以投资也不变；利率的上升将投资抑制回其原有水平，完全抵消了投资函数的向上移动。

If the upward expenditure shift were in consumption, consumption will be higher by the full amount of the shift measured at full-employment income; investment will be reduced by this amount because of the rise in the rate of interest.

如果向上的支出移动发生在消费上，消费将增加在充分就业收入下测量的全部移动量；由于利率上升，投资将减少相同的量。

Because of the rise in the price level, equilibrium real cash balances will be less than before.

由于价格水平上升，均衡实际现金余额将比以前少。

Real wages and employment are unaffected.

实际工资和就业不受影响。

2.12.2 A CHANGE IN MONETARY POLICY
货币政策的变化

Suppose the monetary authority shifts to a tighter monetary policy, that is, shifts $h(i)$ to the left.

假设货币当局转向更紧缩的货币政策，即向左移动 $h(i)$。

We have seen that this implies a shift to the left of the monetary sector curve, so that it intersects the expenditure sector curve at an income below the full-employment level.

我们已经看到，这意味着货币部门曲线向左移动，使其与支出部门曲线相交于低于充分就业水平的收入处。

As in the preceding section this means that the price level is above the equilibrium level.

正如上一节所述，这意味着价格水平高于均衡水平。

The price level will tend to fall, shifting the monetary sector curve back to its intersection with full-employment real income.

价格水平将趋于下降，将货币部门曲线移回其与充分就业实际收入的交点。

The supply curve of real cash balances intersects, at the same point as before, the demand curve for real cash balances at full-employment real income.

实际现金余额供给曲线与充分就业实际收入下的实际现金余额需求曲线相交于与以前相同的点。

The result is that real cash balances, real income, the interest rate, and all other variables except the price level will be the same in new equilibrium as in the old one.

结果是，实际现金余额、实际收入、利率以及除价格水平以外的所有其他变量，在新均衡中都将与旧均衡中相同。

The price level will fall by the proportion by which the money supply was reduced (in nominal terms) at the equilibrium rate of interest.

价格水平将按货币供给（名义上）在均衡利率下减少的比例下降。

2.12.3   A SHIFT IN THE LIQUIDITY PREFERENCE FUNCTION
流动性偏好函数的移动

Suppose that the public reduces the real cash balances it desires to hold, other things equal, either by a change in tastes or by improvements in the means of making payments.

假设公众在其他条件不变的情况下，由于偏好改变或支付手段的改进，减少了其希望持有的实际现金余额。

We have seen that this implies a shift to the right of the monetary sector curve.

我们已经看到，这意味着货币部门曲线向右移动。

Thus the price level is below its new equilibrium level.

因此价格水平低于其新均衡水平。

The price level will rise, shifting the supply curve of real cash balances to the left and shifting the monetary sector curve back to its old intersection with the expenditure sector curve.

价格水平将上升，将实际现金余额供给曲线向左移动，并将货币部门曲线移回其与支出部门曲线的旧交点。

The shifts in the monetary sector are illustrated in Figure 29. Only the demand curve for real cash balances at full-employment real income is shown.
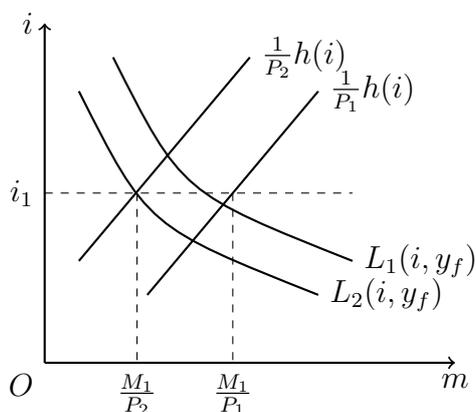货币部门的移动如图 29 所示。只显示了充分就业实际收入下的实际现金余额需求曲线。

Figure 29

This curve shifts from $L_1(i, y_f)$ to $L_2(i, y_f)$. (The effect of the shift on the monetary sector curve is discussed and illustrated in section 7.)
这条曲线从 $L_1(i, y_f)$ 移动到 $L_2(i, y_f)$。（该移动对货币部门曲线的影响在第 7 节中进行了讨论和说明。）

The consequent rise in the price level shifts $(1/P_1)h(i)$ to $(1/P_2)h(i)$, although $h(i)$ itself has not shifted.
随之而来的价格水平上升将 $(1/P_1)h(i)$ 移动到 $(1/P_2)h(i)$，尽管 $h(i)$ 本身并未移动。

Overall equilibrium will occur at the old rate of interest, so that the nominal supply of money is the same as before, at M_1.
总体均衡将发生在旧利率下，因此名义货币供给与以前相同，为 M_1。

Real cash balances fall from M_1/P_1 to M_1/P_2, by the same proportion as the shift to the left of the demand curve (at full-employment real income) for real cash balances; the price level rises by the inverse proportion.
实际现金余额从 M_1/P_1 下降到 M_1/P_2，下降比例与（充分就业实际收入下的）实际现金余额需求曲线向左移动的比例相同；价格水平按反比例上升。

2.12.4 A SHIFT IN THE PRODUCTION FUNCTION
生产函数的移动

Suppose that the production function shifts upward, so that the same employment produces more.
假设生产函数向上移动，使得相同的就业生产更多（产出）。

Suppose also that the investment schedule is unaffected, so that the expenditure sector curve remains unchanged.
同时假设投资计划表不受影响，因此支出部门曲线保持不变。

This shift is illustrated in Figure 30, showing the production function; $f_1(N)$ has shifted upward to the new position $f_2(N)$.
这一移动如图 30 所示，显示了生产函数；$f_1(N)$ 向上移动到新位置 $f_2(N)$。

Full-employment real income is increased by the amount of the upward shift of the production function at N_f, from y_1 to y_2, plus a possible adjustment for a change in the full-employment value of N_f.
充分就业实际收入增加了生产函数在 N_f 处向上移动的量，从 y_1 到 y_2，加上 N_f 充分就业值可能变化的调整量。

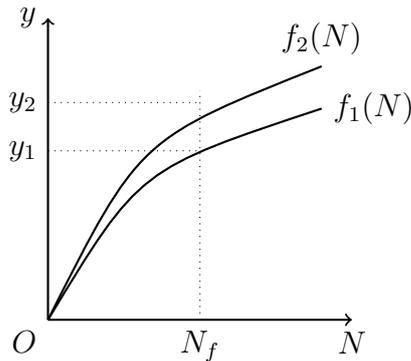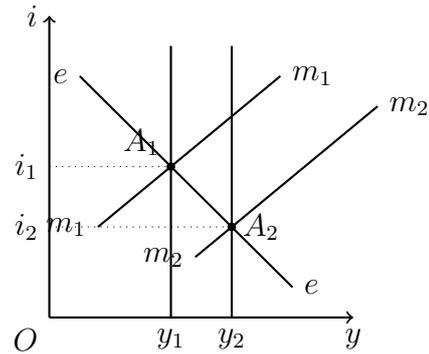| Figure 30	Figure 31

Figure 30　　　　　　　　　**Figure 31**

The interaction of this change in the production-employment sector with the other sectors appears in Figure 31.
这一生产-就业部门的变化与其他部门的相互作用如图 31 所示。

The shift to the right of full-employment real income moves it away from the intersection of the curves for the monetary sector and the expenditure sector.
充分就业实际收入向右移动，使其远离货币部门和支出部门曲线的交点。

Then the price level is above its equilibrium level; it must fall.
此时价格水平高于其均衡水平；它必须下降。

The resultant fall in the price...
随之而来的价格下降……

...level shifts the monetary sector curve to the right, from m_1 to m_2, so that it intersects the expenditure sector curve at A_2, at which real income has risen to its new full-employment level y_2 and the rate of interest has fallen from i_1 to i_2.
……水平将货币部门曲线向右移动，从 m_1 到 m_2，使其与支出部门曲线相交于 A_2，此时实际收入已上升至其新的充分就业水平 y_2，利率从 i_1 下降到 i_2。

The following changes have resulted: the rate of interest and the price level are lower; real consumption, real investment, real income, and real cash balances are all higher.
结果发生了以下变化：利率和价格水平降低；实际消费、实际投资、实际收入和实际现金余额都更高。

These four examples cover the main shifts that the model can be used to

analyze.
这四个例子涵盖了该模型可用于分析的主要移动。

We have considered two shifts in the monetary sector and one shift each in the expenditure and the production-employment sectors.
我们考虑了货币部门的两次移动，以及支出部门和生产-就业部门各一次移动。

These illustrate certain general properties of the model, within that range in which none of the limiting cases of section 8 applies.
这些说明了模型在第 8 节的极限情况均不适用的范围内的某些一般性质。

Since the production-employment sector is self-contained, with the number of variables in it equal to the number of equations, the equilibrium values of the variables in this sector are independent of shifts in the other sectors.
由于生产-就业部门是自包含的，其中的变量数量等于方程数量，因此该部门变量的均衡值独立于其他部门的移动。

Similarly, since only three variables besides real income appear in the expenditure sector, namely real consumption, real investment, and the rate of interest, there is a total of six variables in the two sectors combined, equal to the number of equations in both combined.
同样，由于除实际收入外，支出部门只出现三个变量，即实际消费、实际投资和利率，因此两个部门合计共有六个变量，等于两个部门合计的方程数量。

Hence the equilibrium values of these three additional variables are independent of shifts in the monetary sector.
因此，这三个额外变量的均衡值独立于货币部门的移动。

The monetary sector, by contrast, has too many variables to determine anything except when it is combined with the whole model; hence the equilibrium values of real cash balances and the price level will be affected by shifts in all three sectors.
相比之下，货币部门有太多的变量，除非与整个模型结合，否则无法确定任何东西；因此，实际现金余额和价格水平的均衡值将受到所有三个部门移动的影响。

These characteristics of the model depend on some key assumptions. For example, that the equilibrium values of all the variables appearing in the two nonmonetary sectors should be independent of all shifts occurring in the monetary sector depends critically on the assumption that each of the equations in those two sectors is independent of the price level of all goods and services.
模型的这些特征取决于一些关键假设。例如，两个非货币部门中出现的所有变量的均衡值应独立于货币部门发生的所有移动，这关键取决于这两个部门中的每个方程都独立于所有商品和服务的价格水平这一假设。

Some of these key assumptions, and the effects they have on the properties of the national income model, are the subject of the next chapter.
其中一些关键假设，以及它们对国民收入模型性质的影响，是下一章的主题。

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APPENDIX
MATHEMATICAL APPENDIX TO CHAPTER 2

The national income model developed in this chapter, in its consolidated sector form, consists of the three equations
本章开发的国民收入模型，以其合并部门形式，由以下三个方程组成：

$$y = \frac{a + g_0 + g_1 i}{1 - b} \tag{21}$$

$$\frac{h(i)}{P} = L(i, y) \tag{22}$$

$$y = f(N_f) = y_f \tag{26}$$

Substituting y_f into the first equation (21) yields the equilibrium value of the rate of interest i_f; substituting both into (22) yields the equilibrium price level

P_f:

将 y_f 代入第一个方程 (21) 得到利率的均衡值 i_f；将两者代入 (22) 得到均衡价格水平 P_f：

$$P_f = \frac{h(i_f)}{L(i_f, y_f)}$$

For comparative statics of changes in the expenditure and monetary sectors, we take differentials after first noting that for all such changes we have from (26)

对于支出和货币部门变化的比较静态分析，我们在首先注意到对于所有此类变化我们从 (26) 有如下关系后，进行微分：

$$\delta y = 0$$

because y_f is a constant. For a change in the constant term in the consumption function $\delta a \neq 0$, we have from (21)

因为 y_f 是常数。对于消费函数中常数项的变化 $\delta a \neq 0$，我们从 (21) 有

$$0 = \frac{\delta a + g_1 \delta i}{1 - b}$$

which gives

这给出

$$-g_1 \delta i = \delta a$$

As a result, investment falls by exactly the amount of the upward shift in consumption, through the interest-rate effect

结果是，通过利率效应，投资下降的量正好等于消费向上移动的量

$$\delta z = g_1 \delta i = -\delta a$$

The rise in the interest rate is just enough to give that result. For the monetary sector, we write

利率的上升恰好足以产生这一结果。对于货币部门，我们写道

$$h(i) = PL(i, y)$$

from which we have

从中我们有

$$h' \delta i = L \delta P + P L_i \delta i$$

This gives
这给出

$$\delta P = \frac{h' - PL_i}{L}\delta i$$

or
或

$$\frac{\delta P}{P} = \frac{h'\delta i - PL_i\delta i}{PL} = \frac{h'\delta i - PL_i\delta i}{h(i)}$$
$$= \frac{\delta M^S - \delta M^D}{M} \qquad \text{(A-1)}$$

where M is the original quantity of cash, $\delta M^S = h'\delta i$, and $\delta M^D = PL_i\delta i$.
其中 M 是原始现金数量，$\delta M^S = h'\delta i$，$\delta M^D = PL_i\delta i$。

In (A-1) we have in the numerator the excess supply of cash balances induced by the change in the interest rate.
在 (A-1) 中，分子是由利率变化引起的现金余额超额供给。

For example, if the interest rate rises, the quantity of cash supplied increases by the amount $h'\delta i$ while the quantity demanded decreases by the amount $PL_i\delta i$.
例如，如果利率上升，现金供给量增加 $h'\delta i$，而需求量减少 $PL_i\delta i$。

With the minus sign the quantity in the numerator sums their absolute values and measures the discrepancy between supply and demand at the higher interest rate and the old price level.
带有负号的分子将它们的绝对值相加，衡量了在较高利率和旧价格水平下供需之间的差异。

The price level must rise just enough to eliminate this discrepancy in real terms, that is, by the proportion it bears to the original money stock.
价格水平必须上升到足以在实际项上消除这种差异，即按其与原始货币存量的比例。

Therefore, if the rise in the equilibrium interest rate creates an excess supply of money equal to 1 percent of the original money stock, the price level must rise 1 percent to restore equilibrium.
因此，如果均衡利率的上升产生了等于原始货币存量 1% 的超额货币供给，价格水平必须上升 1% 以恢复均衡。

(The above results are identical throughout for a change in the constant g_0 in the investment function.)
（对于投资函数中常数 g_0 的变化，上述结果自始至终是相同的。）

The result in equation (A-1) partly anticipates those we get for shifts in the monetary sector.

方程 (A-1) 中的结果部分预示了我们在货币部门移动中得到的结果。

For such shifts, all the parameters in the expenditure sector remain unchanged, so that $\delta i = 0$.
对于此类移动，支出部门的所有参数保持不变，因此 $\delta i = 0$。

For a shift in the supply curve $\delta h \neq 0$, we have
对于供给曲线的移动 $\delta h \neq 0$，我们有

$$\delta h = L \delta P$$

and
和

$$\frac{\delta P}{P} = \frac{\delta h}{PL} = \frac{\delta h}{h} = \frac{\delta M^S}{M} \tag{A-2}$$

The price level rises (falls) by the same proportion as the money supply increases (decreases), at the equilibrium interest rate.
在均衡利率下，价格水平上升（下降）的比例与货币供给增加（减少）的比例相同。

For a shift in the demand curve $\delta L \neq 0$ we have
对于需求曲线的移动 $\delta L \neq 0$，我们有

$$0 = L \delta P + P \delta L$$

and
和

$$\frac{\delta P}{P} = \frac{-\delta L}{L} \tag{A-3}$$

The price level falls (rises) by the same proportion as the demand for money increases (decreases), at the equilibrium interest rate.
在均衡利率下，价格水平下降（上升）的比例与货币需求增加（减少）的比例相同。

The result (A-2) is that given by the quantity theory of money. Results (A-1) and (A-3) parallel (A-2).
结果 (A-2) 是由货币数量论给出的。结果 (A-1) 和 (A-3) 与 (A-2) 平行。

Finally consider a change in full-employment real income because of changed technology or factor inputs
最后考虑由于技术或要素投入改变导致的充分就业实际收入的变化

$$\delta y_f > 0$$

Then from (21) we have
那么从 (21) 我们有

$$\delta y = \frac{g_1 \delta i}{1 - b} = k g_1 \delta i$$

and
和

$$\delta i = \frac{\delta y}{k g_1} < 0 \quad \text{because } g_1 < 0$$

From (22) we have
从 (22) 我们有

$$h' \delta i = L \delta P + P(L_i \delta i + L_y \delta y)$$

and
和

$$\frac{\delta P}{P} = \frac{h' - P L_i}{h} \delta i - \frac{L_y \delta y}{L} \tag{A-4}$$

The terms that multiply δi in (A-4) are all positive, while δi is negative; the terms that multiply δy, taken separately, are all positive, as is δy, and they have a minus sign.
在 (A-4) 中乘以 δi 的项都是正的，而 δi 是负的；乘以 δy 的项单独看都是正的，δy 也是正的，并且它们带有一个负号。

Thus both parts of δP are negative, so the price level necessarily falls when full-employment real income rises.
因此 δP 的两部分都是负的，所以当充分就业实际收入上升时，价格水平必然下降。

The terms in δi in (A-4) are the same as the expression that led to (A-1) and have the same interpretation.
在 (A-4) 中关于 δi 的项与导致 (A-1) 的表达式相同，并且具有相同的解释。

δP now has the additional term in δy, which is the additional proportion demanded of cash balances due to the increase in full-employment real income.
δP 现在有了关于 δy 的额外项，这是由于充分就业实际收入增加而导致的现金余额需求的额外比例。

Thus the proportionate fall in the price level is the proportion of excess demand for cash due to (1) the reduced supply due to the fall in the interest rate, (2) the increased demand due to this same fall, and (3) the increased demand due to the rise in income.
因此，价格水平的成比例下降是由于以下原因造成的现金超额需求的比例：(1) 由于利

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率下降导致的供给减少，(2) 由于同样的下降导致的需求增加，以及 (3) 由于收入增加导致的需求增加。

3 ADVANCED ANALYSIS OF NATIONAL INCOME
国民收入的高级分析

3.1 INTRODUCTORY REMARKS
引言

Although Chapter 2 introduced national income analysis, it gave scant treatment to several important questions, some of primarily academic interest and some of practical interest.
虽然第二章介绍了国民收入分析，但它对几个重要问题的处理很少，其中一些主要是学术兴趣，另一些则是实际兴趣。

We shall now take up the more significant of these.
我们现在将讨论其中更重要的问题。

Some of these questions involve special or limited cases of the model in Chapter 2; others involve modification of the assumptions used there.
其中一些问题涉及第二章模型的特殊或有限情况；另一些涉及对那里使用的假设的修改。

3.2 INCONSISTENT EQUATIONS
不一致方程

Several authors debated in the 1930s and 1940s whether the equations of the national income model have a full-employment solution, that is, are consistent with each other.
几位作者在 20 世纪 30 年代和 40 年代争论国民收入模型的方程是否有充分就业解，即是否彼此一致。

This question must be resolved by experience, not by reasoning from basic principles.
这个问题必须通过经验来解决，而不是通过从基本原则推理来解决。

Equality between the number of equations and the number of unknowns is not enough to guarantee a single set of values, one for each unknown, that will simultaneously satisfy all the equations.
方程数量与未知数数量相等并不足以保证有一组值（每个未知数一个）能同时满足所有方程。

(Consistency is still less certain if we insert an additional equation in the same variables.)
（如果我们插入一个关于相同变量的额外方程，一致性就更不确定了。）

Three significant instances appear in Keynes's *General Theory*.
凯恩斯的《通论》中出现了三个重要的例子。

(1) Wages might be set too high to be consistent with full employment, where full employment means that every qualified worker willing to work at the going

wage is able to find a job.
（1）工资可能定得太高，以至于与充分就业不一致，这里的充分就业意味着每个愿意在现行工资下工作的合格工人都能找到工作。

The wage might be higher because of noncompetitive conditions in the production-employment sector; if so, employment would be lower than it would be under perfect competition in this sector.
由于生产-就业部门的非竞争条件，工资可能会更高；如果是这样，就业将低于该部门完全竞争下的水平。

If money wages are fixed, we must write for the labor supply function
如果名义工资是固定的，我们必须将劳动力供给函数写为

$$W = W_0 \tag{27}$$

a constant, in place of the previous function
一个常数，代替之前的函数

$$N = j(w) \tag{25}$$

With this substitution, the model's solution has different properties in some respects from those mentioned at the end of Chapter 2.
通过这种替换，模型的解在某些方面具有与第二章末尾提到的性质不同的性质。

It will be inconsistent with equation (25); a model containing both equations at once will be inconsistent.
它将与方程 (25) 不一致；同时包含这两个方程的模型将是不一致的。

This situation is illustrated in Figure 32.
这种情况如图 32 所示。

Suppose that the labor force that would be available at different real wages is still given by the function $j(w)$; but because of the setting of the money wage at W_0, none is available at any lower money wage.
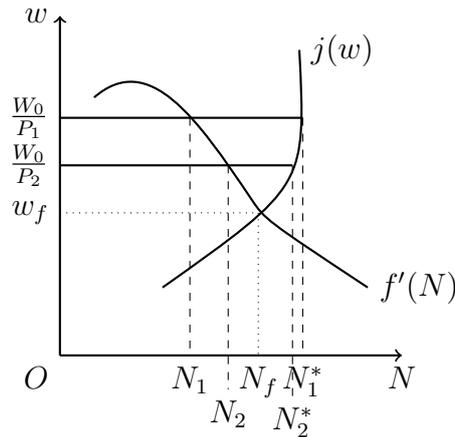假设在不同实际工资下可用的劳动力仍然由函数 $j(w)$ 给出；但由于名义工资设定在 W_0，在任何更低的名义工资下都没有劳动力可用。

Figure 32

The supply of labor at each price level P is given by a horizontal line at the height W_0/P extending from the vertical axis out to the amount of employment given by $j(w)$ for that real wage.

在每个价格水平 P 下的劳动力供给由一条高度为 W_0/P 的水平线给出，从纵轴延伸到该实际工资下由 $j(w)$ 给出的就业量。

Thus we have a family of labor-supply curves in this figure, one for each price level.

因此，我们在图中有一组劳动力供给曲线，每个价格水平一条。

If the price level is at the low value P_1, at which real wages are relatively high, the labor supply is the horizontal line at W_0/P_1, up to a maximum labor supply offered at N_1^*; but only N_1 of labor will be demanded by business firms.

如果价格水平处于低值 P_1，此时实际工资相对较高，劳动力供给是位于 W_0/P_1 的水平线，直到 N_1^* 提供的最大劳动力供给；但企业只需要 N_1 的劳动力。

At the relatively higher price level P_2, the labor supply up to a maximum of N_2^* is given by the horizontal line at W_0/P_2; here the demand for labor is N_2.

在相对较高的价格水平 P_2 下，直到最大值 N_2^* 的劳动力供给由位于 W_0/P_2 的水平线给出；这里的劳动力需求是 N_2。

For each of these amounts of labor demanded there will be a different total production and income, given by the production function.

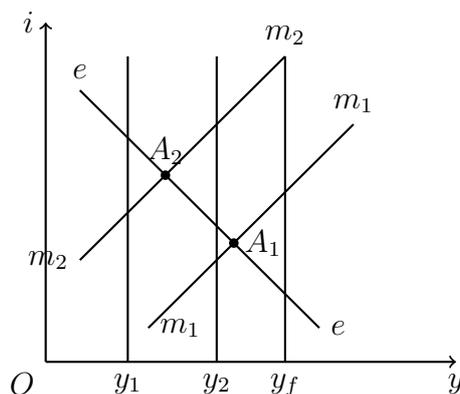对于每一个劳动力需求量，都会有不同的总生产和收入，由生产函数给出。

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Figure 33

With a fixed money wage, we get a sequence of values of equilibrium real income, one for each price level, just as there is a family of monetary sector curves, one for each price level.
在名义工资固定的情况下，我们得到一系列均衡实际收入值，每个价格水平一个，就像有一组货币部门曲线，每个价格水平一条一样。

This is illustrated in Figure 33.
这在图 33 中说明。

At the low price level P_1 the real income y_1 given by the production-employment sector is lower than the intersection of the monetary sector curve m_1 with the expenditure sector curve ee at A_1.
在低价格水平 P_1 下，生产-就业部门给出的实际收入 y_1 低于货币部门曲线 m_1 与支出部门曲线 ee 在 A_1 处的交点。

The price level will tend to rise.
价格水平将趋于上升。

A rise in the price level to P_2 increases the real income given by the production-employment sector to y_2 and shifts the monetary sector curve to the left to m_2.
价格水平上升到 P_2 将生产-就业部门给出的实际收入增加到 y_2，并将货币部门曲线向左移动到 m_2。

Their new intersection at A_2 is consistent with...
它们在 A_2 处的新交点与……一致

...equilibrium all around. Real income is below the full-employment level as previously defined, and employment at N_2 is less than the maximum willing supply of labor N_2^*.
……全面的均衡。实际收入低于之前定义的充分就业水平，且 N_2 处的就业小于最大愿意提供的劳动力供给 N_2^*。

A way to restore equilibrium at full employment, on the function $j(w)$, is to increase the supply of money enough to lower W_0/P to w_f, by driving up the price level.
在函数 $j(w)$ 上恢复充分就业均衡的一种方法是，通过推高价格水平，增加足够的货币供给以将 W_0/P 降低到 w_f。

This step removes the inconsistency in the model that has both the fixed money wage and the previously defined labor supply function, by making W_0/P pass through the intersection of $j(w)$ and $f'(N)$.
这一步骤通过使 W_0/P 通过 $j(w)$ 和 $f'(N)$ 的交点，消除了既有名义工资固定又有先前定义的劳动力供给函数的模型中的不一致性。

Employment rises to N_f, and production rises to full-employment real income y_f.

就业上升到 N_f，生产上升到充分就业实际收入 y_f。

However, increasing the money supply will fail to restore full employment if we assume a fixed real wage, rather than a fixed money wage, at too high a level for full employment.
然而，如果我们假设固定的是实际工资而不是名义工资，且水平对于充分就业来说太高，那么增加货币供给将无法恢复充分就业。

This assumption better represents any monopoly power exercised by unions; their ability to extract high real wages is not affected by changes in the price level.
这一假设更好地代表了工会行使的任何垄断力量；他们获取高实际工资的能力不受价格水平变化的影响。

That the union has the right to reopen wage negotiations at any time—regardless of what the agreement may say—implies that the union can maintain the initial real wage regardless of monetary policy.
工会有权在任何时候重新开启工资谈判——不管协议怎么说——这意味着工会可以不顾货币政策维持初始实际工资。

Frequent cost-of-living adjustments, if specified in the wage agreement, also have the same effect.
如果在工资协议中规定了频繁的生活成本调整，也会产生同样的效果。

There is only one level of production consistent with equilibrium in the production-employment sector—that determined by the high fixed real wage and the corresponding low employment.
在生产-就业部门，只有一个生产水平与均衡一致——即由高固定实际工资和相应的低就业决定的水平。

An easy money policy in this case will simply raise the price level without changing production and employment.
在这种情况下，宽松的货币政策只会提高价格水平，而不会改变生产和就业。

From a practical point of view an intermediate case may also be important, in which unions periodically exercise monopoly power in arriving at a wage agreement that in part has the character of a long-term contract.
从实践的角度来看，中间情况也可能很重要，即工会在达成具有长期合同性质的工资协议时周期性地行使垄断力量。

Such an agreement may specify a money wage that implies low employment at the prices then prevailing.
这样的协议可能会规定一个名义工资，这意味着在当时的现行价格下就业率较低。

An easy money policy will then increase employment during the term of the wage agreement, if the agreement is not revised before it expires.
如果协议在到期前未被修改，宽松的货币政策将在工资协议期间增加就业。

When a new agreement is negotiated, real wages and employment will again

presumably go back to the levels implied by the unions' monopoly power.
当谈判达成新协议时，实际工资和就业大概会再次回到工会垄断力量所暗示的水平。

Indeed, the union may choose to set an even higher real wage, nonoptimal for its members because it causes too much unemployment, if they expect it to be undone partly by subsequent inflation.
事实上，如果工会预期随后的通货膨胀会部分抵消实际工资，他们可能会选择设定一个甚至更高的实际工资（这对成员来说并非最优，因为它会导致过多的失业）。

In such a situation we can say that the rate of inflation will be determined by monetary policy, while the average level of employment and the movement around this average will be determined by the length of term of the wage agreement and by the extent to which the unions anticipate further inflation in their wage settlements.
在这种情况下，我们可以说通货膨胀率将由货币政策决定，而平均就业水平及围绕该平均值的波动将由工资协议的期限长度以及工会在工资结算中预期进一步通胀的程度决定。

In summary, if the monetary authority rests content in letting employment stay at the low level implied by the initial exercise of the supposed monopoly power of the unions, there will be no continuing inflation.
总之，如果货币当局满足于让就业停留在工会最初行使所谓的垄断力量所暗示的低水平上，就不会有持续的通货膨胀。

If in contrast the authorities try to increase employment through an inflationary policy, they will partially succeed until such time as unions begin to anticipate further inflation in their wage settlements.
相反，如果当局试图通过通货膨胀政策来增加就业，他们会取得部分成功，直到工会开始在工资结算中预期进一步的通胀为止。

When they do, the situation will be one of inflation and low employment, unless the inflation outstrips the unions' expectations by proceeding at an ever-increasing rate.
一旦发生这种情况，局势将变成通货膨胀与低就业并存，除非通货膨胀以不断加快的速度进行，从而超过工会的预期。

(2) A second possibility of inconsistency arises in connection with a limiting case discussed in section 8 of Chapter 2, in which the demand curves for real cash balances, or the supply curve, imply a horizontal monetary sector curve over the relevant range at too high a rate of interest.
（2）第二种不一致的可能性出现在与第 2 章第 8 节讨论的极限情况相关联时，即实际现金余额的需求曲线或供给曲线意味着货币部门曲线在相关范围内呈水平状，且利率过高。

This type of monetary sector curve results either if the monetary authority pegs the rate of interest or if the demand curves for real cash balances are all horizontal over a certain range.
如果货币当局钉住利率，或者实际现金余额的需求曲线在一定范围内都是水平的，就会产生这种类型的货币部门曲线。

The monetary sector curve also may merely be nearly horizontal and still be inconsistent with equilibrium as would happen, for example, if the demand curves remain asymptotically above an interest rate too high for equilibrium.

货币部门曲线也可能仅仅是接近水平，但仍然与均衡不一致，例如，如果需求曲线渐近地保持在一个对于均衡来说太高的利率之上，就会发生这种情况。

If so, and if the minimum rate of interest set by the monetary sector curve is higher than the rate at which the expenditure sector curve reaches full-employment real income, there will be no price level at which the three curves can intersect in the same point.

如果是这样，并且货币部门曲线设定的最低利率高于支出部门曲线达到充分就业实际收入时的利率，那么就不存在一个能使三条曲线相交于同一点的价格水平。

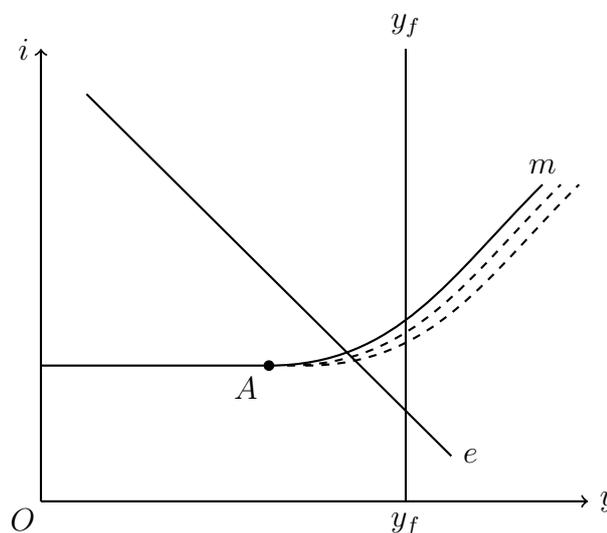Such a situation is illustrated in Figure 34.

这种情况如图 34 所示。

Figure 34

If the rigidity in the monetary sector is due to the pegging of the interest rate by the monetary authority, there is no rising section of the monetary curve; if it is due to the shape of the demand curves for real cash balances, the rising section of the monetary sector curve will shift to the right as indicated, as the price level falls, without affecting the inconsistency of the system.

如果货币部门的刚性是由于货币当局钉住利率造成的，那么货币曲线就没有上升部分；如果是由于实际现金余额需求曲线的形状造成的，随着价格水平下降，货币部门曲线的上升部分将如所示向右移动，而不影响系统的不一致性。

No matter how far the price level falls, the monetary sector curve will intersect the expenditure sector curve at the point A, at a lower real income than the full-employment level.

无论价格水平下降多少，货币部门曲线都将在 A 点与支出部门曲线相交，此时的实际收入低于充分就业水平。

(3) The third possibility of inconsistency is that the expenditure sector curve

never reaches the full-employment level of real income at any positive rate of interest.
（3）第三种不一致的可能性是，支出部门曲线在任何正利率下都无法达到充分就业的实际收入水平。

Although this curve slopes down, this slope does not assure that the expenditure sector's equilibrium real income will rise to the full-employment level at any positive interest rate.
虽然这条曲线向下倾斜，但这种斜率并不能保证支出部门的均衡实际收入会在任何正利率下上升到充分就业水平。

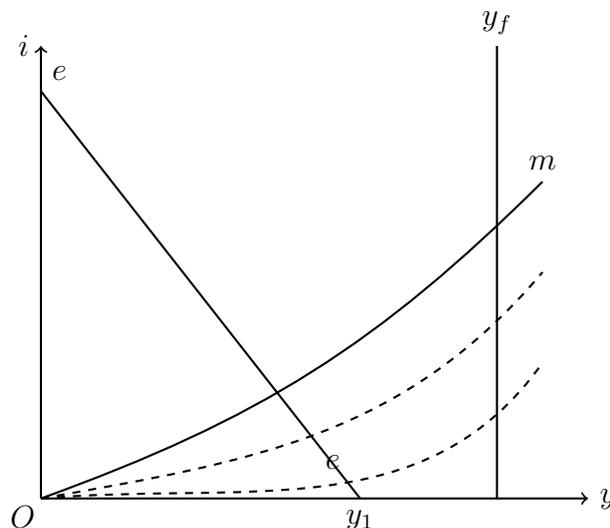**This situation is illustrated in Figure 35.**
这种情况如图 35 所示。

Figure 35

The expenditure sector curve intersects the horizontal axis at y_1, a real income below the full-employment level.
支出部门曲线与横轴相交于 y_1，这是一个低于充分就业水平的实际收入。

Even if the monetary sector curve converges on the horizontal axis as the price level falls, it stays above the axis.
即使货币部门曲线随着价格水平下降而收敛于横轴，它也保持在轴之上。

Its intersection with the expenditure sector curve will therefore always be to the left of full-employment real income.
因此，它与支出部门曲线的交点将始终位于充分就业实际收入的左侧。

A failure of the expenditure sector curve to reach full-employment real income at any positive rate of interest would be due to poor investment prospects.
支出部门曲线在任何正利率下都无法达到充分就业实际收入，将归因于糟糕的投资前景。

At the equilibrium in the expenditure sector for each interest rate, income is

just enough to make desired saving equal investment.
在每个利率下的支出部门均衡中，收入刚好足以使意愿储蓄等于投资。

The failure of this sector ever to reach full-employment real income means that investment at any positive interest rate is less than what saving would be at full-employment real income.
该部门永远无法达到充分就业实际收入，意味着在任何正利率下的投资都小于充分就业实际收入下的储蓄。

Examples 2 and 3, just given, differ from each other with respect to the minimum rate of interest.
刚才给出的例 2 和例 3 在最低利率方面互不相同。

In both cases this minimum is too high to permit the attainment of overall equilibrium.
在这两种情况下，这个最低值都太高，无法实现全面均衡。

They are distinct in principle, however, because each of them raises a different set of issues.
然而，它们在原则上是不同的，因为每一个都引发了一组不同的问题。

Both these cases represent potential inconsistencies in the national income model as set out in Chapter 2.
这两种情况都代表了第 2 章中阐述的国民收入模型中潜在的不一致性。

Example 1, in contrast, is an inconsistency introduced by the insertion of another equation in addition to the ones already there.
相比之下，例 1 是由于在现有方程之外插入了另一个方程而引入的不一致性。

3.3 REAL CASH BALANCES AND CONSUMPTION
实际现金余额与消费

Consider now how the model changes if the quantity of real cash balances is a variable in the consumption function.
现在考虑如果实际现金余额的数量是消费函数中的一个变量，模型会如何变化。

The effect of cash balances on consumption is known as the Pigou effect, or the real balance effect.
现金余额对消费的影响被称为庇古效应，或实际余额效应。

It asserts that a nonrecurrent change in real cash balances held by the private sector of the economy, such as that caused by a change in the price level, will induce a change in consumption.
它断言，经济体私营部门持有的实际现金余额的非经常性变化（例如由价格水平变化引起的变化）将引起消费的变化。

It does not depend on expectations of further change in the price level.
它不依赖于对价格水平进一步变化的预期。

If the quantity of real cash balances is a variable in the consumption function, as, for example, in the form

如果实际现金余额的数量是消费函数中的一个变量，例如，形式如下：

$$c = a + b_1 y + b_2 m \qquad (1)$$

where b_2 is a positive constant, the equation of the expenditure sector becomes

其中 b_2 是一个正常数，支出部门的方程变为：

$$y = \frac{a + g_0 + g_1 i + b_2 m}{1 - b} \qquad (28)$$

With this new variable in the expenditure sector, its three equations contain five variables; these three equations simplify into (28), which has three variables, rather than two.

随着支出部门中这个新变量的加入，其三个方程包含五个变量；这三个方程简化为 (28)，它有三个变量，而不是两个。

It can no longer be represented by a single curve but must be represented by a family of curves, one for each price level.

它不再能由单一曲线表示，而必须由一族曲线表示，每条曲线对应一个价格水平。

This is illustrated in Figure 36, which has a family of curves for the expenditure sector, one for each price level, as does the monetary sector.
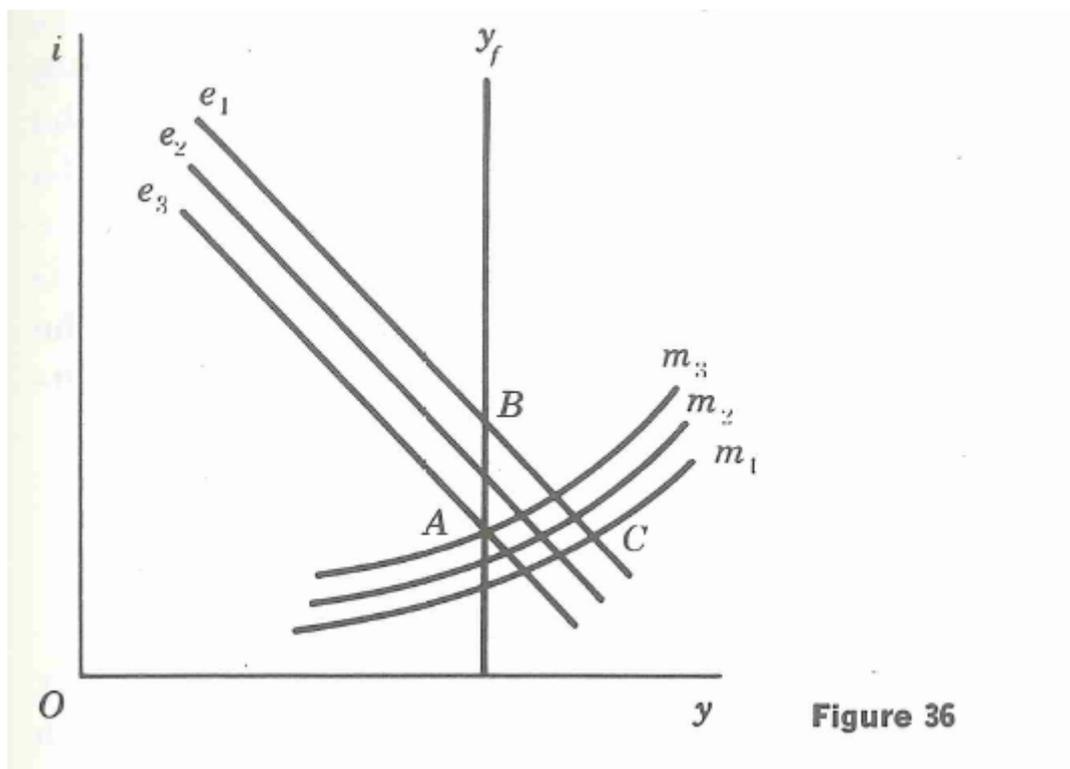
这如图 36 所示，其中支出部门有一族曲线，每个价格水平一条，货币部门也是如此。

Figure 36

If the price level is P_1, the monetary and expenditure sector curves intersect at C, at a higher than full-employment real income, and the price level will tend to rise.
如果价格水平是 P_1，货币和支出部门曲线相交于 C 点，处于高于充分就业的实际收入水平，价格水平将趋于上升。（注：原文图中文本描述与图中标记可能有出入，此处翻译忠实于原文文本，但图 36 中 C 点通常位于 A 和 B 之间，原文描述似乎有误或指代图中未明确标出的情况，通常 P_1 对应低产出高利率的非均衡点，或者此处描述的是通胀缺口情况。根据图示，B 点对应较低产出，若 P 下降，曲线右移至 A。原文描述似乎是反向的或者是针对不同情境，请留意。）

As this rise reduces real cash balances, consumption will fall, and the expenditure sector curve shifts downward to the left.
随着这种上升减少了实际现金余额，消费将下降，支出部门曲线向左下方移动。

Equilibrium is reached at a price level P_3 at which the corresponding monetary and expenditure sector curves intersect at the point A, at full-employment real income.
当价格水平达到 P_3 时实现均衡，此时相应的货币和支出部门曲线相交于 A 点，处于充分就业实际收入水平。

Putting real cash balances in the consumption function changes one of the previous main properties of the system.
将实际现金余额放入消费函数改变了系统以前的主要属性之一。

Under the old assumptions, the equilibrium values of the variables in the nonmonetary sectors of the economy were independent of all shifts in the monetary sector.
在旧的假设下，经济中非货币部门变量的均衡值独立于货币部门的所有变动。

This is no longer true.
这不再成立了。

For example, suppose an initial equilibrium at the point B, with price level P_1, has been disturbed by a shift in the demand function for cash balances toward smaller real cash balances, shifting the monetary sector curve for P_1 to the position m_1 shown in Figure 36.
例如，假设在 B 点（价格水平为 P_1）的初始均衡被现金余额需求函数向更小的实际现金余额的移动所扰乱，将 P_1 对应的货币部门曲线移动到图 36 所示的 m_1 位置。

The resulting new equilibrium, at the point A with price level P_3, involves a lower interest rate than before and a changed mix of consumption and investment.
由此产生的在 A 点（价格水平为 P_3）的新均衡，涉及比以前更低的利率以及消费和投资组合的改变。

The equilibrium values of the nonmonetary variables are no longer independent of events in the monetary sector.
非货币变量的均衡值不再独立于货币部门的事件。

In this model, a shift in monetary policy has no effect on any variable in the system except the price level, as before, because the change in monetary policy does not affect the equilibrium value of real cash balances.
在这个模型中，货币政策的转变除了价格水平外，对系统中的任何变量都没有影响，正如以前一样，因为货币政策的改变不影响实际现金余额的均衡值。

(Government bonds, deflated by the price level, might plausibly also appear in the consumption function; in that case even a change in monetary policy will affect the equilibrium values of the rate of interest and other variables. See Chapter 9.)
（经价格水平平减的政府债券也可能出现在消费函数中；在这种情况下，即使是货币政策的改变也会影响利率和其他变量的均衡值。见第 9 章。）

The real balance effect offers a possible route to overall equilibrium in a system in which the expenditure sector curve at first falls short of the full-employment level of real income even at a zero rate of interest.
实际余额效应为这样一个系统提供了一条通往全面均衡的可能途径：在该系统中，即使在零利率下，支出部门曲线最初也达不到充分就业的实际收入水平。

With this effect, a fall in the price level shifts the expenditure sector curve upward and might eventually shift it far enough to make it reach full-employment real income at a positive rate of interest.
有了这种效应，价格水平的下降会使支出部门曲线向上移动，并可能最终将其移动得足够远，使其在正利率下达到充分就业实际收入。

However, the existence of the real balance effect is doubtful, and it is even more doubtful that the effect is strong enough to guarantee equilibrium.
然而，实际余额效应的存在是值得怀疑的，更令人怀疑的是该效应是否强到足以保证均衡。

3.4 REAL CASH BALANCES AND PRODUCTION
实际现金余额与生产

Whether or not cash balances help determine consumption, they assuredly are a factor of production.
无论现金余额是否有助于决定消费，它们无疑是一个生产要素。

Since people willingly hold cash balances at a sacrifice, it can be inferred that cash balances yield equivalent value.
既然人们愿意牺牲一定代价持有现金余额，可以推断现金余额产生了等值的价值。

Whether or not this value appears in tangible production or comes as a direct yield of satisfaction to households, total product changes when real cash balances change.
无论这种价值是出现在有形生产中，还是作为对家庭满足感的直接收益，当实际现金余额变化时，总产品都会变化。

For example, if the householder had more frequent, smaller receipts and pay-

ments for the same income stream, he would have to spend more of what would otherwise be his leisure time making transactions.

例如，如果户主对于相同的收入流有更频繁、更小额的收支，他将不得不花费更多原本属于闲暇的时间来进行交易。

Also, the householder holds cash balances because of the security they give him against unforeseen contingencies.

此外，户主持有现金余额是因为它们能为他提供应对不可预见突发事件的安全感。

(Other assets can be sold to meet such contingencies but at an inconvenience and possible loss.)

（其他资产可以出售以应对此类突发事件，但会带来不便和可能的损失。）

This security, whose value to the householder can be measured by straightforward imputation, is an element of both income and consumption, similar to leisure.

这种安全感（其对户主的价值可以通过直接估算来衡量）既是收入的要素，也是消费的要素，类似于闲暇。

It follows that full-employment real income depends on the monetary sector; it has a different value for each quantity of real cash balances.

由此可见，充分就业实际收入取决于货币部门；对于每一数量的实际现金余额，它都有不同的值。

Real cash balances will appear in the production function, so that it becomes

实际现金余额将出现在生产函数中，使其变为：

$$y = f(N, m) \tag{29}$$

The marginal productivity of labor will also depend on this variable, that is,

劳动的边际生产力也将取决于这个变量，即：

$$w = f_N(N, m) = \frac{\partial f(N, m)}{\partial N} \tag{30}$$

Hence equilibrium real wages and employment depend on real cash balances, and no longer have a self-contained system.

因此，均衡实际工资和就业取决于实际现金余额，不再拥有一个自包含的系统。

A different equilibrium value of each of the variables in this sector will correspond to each different value of real cash balances.

该部门中每个变量的每一个不同的均衡值都将对应于实际现金余额的每一个不同值。

When a shift in either the expenditure sector or the monetary sector changes equilibrium real cash balances, full-employment real income will also change.

当支出部门或货币部门的变动改变均衡实际现金余额时，充分就业实际收入也会改变。

This change, to a first approximation, equals the product of the average rate of return on other assets and the change in equilibrium real cash balances.
作为一级近似，这种变化等于其他资产的平均回报率与均衡实际现金余额变化的乘积。

Full-employment real income is no longer a single value, that is, not a single vertical line in Figure 37, but a family of vertical lines.
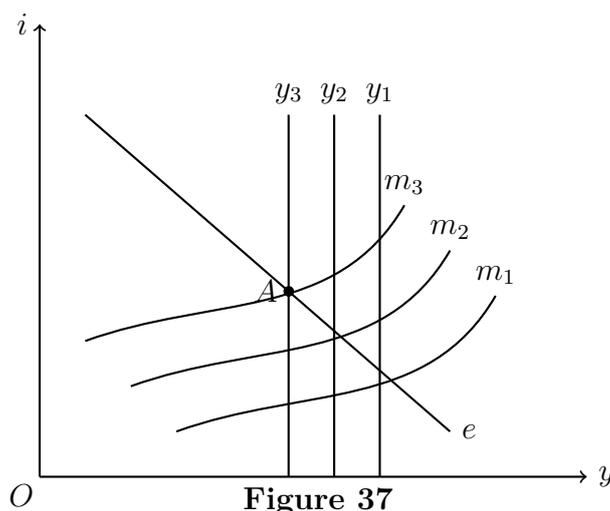充分就业实际收入不再是一个单一的值，也就是说，不是图 37 中的一条垂直线，而是一族垂直线。

Figure 37

When real cash balances are above their equilibrium level, at a price level P_1, the price level will tend to rise, shifting both the monetary sector curve and full-employment real income to the left.
当实际现金余额高于其均衡水平时（在价格水平 P_1 下），价格水平将趋于上升，使货币部门曲线和充分就业实际收入都向左移动。

Equilibrium is reached at the higher price level P_3, at which all three sector curves intersect at the same point A.
在较高的价格水平 P_3 处达到均衡，此时所有三个部门的曲线相交于同一点 A。

(For simplicity, the expenditure sector function has been drawn as a single curve.)
（为简单起见，支出部门函数被画成了一条单一曲线。）

As when real cash balances are in the consumption function, this equilibrium point shifts if a shift in the monetary sector changes the equilibrium value of real cash balances.
正如实际现金余额处于消费函数中时一样，如果货币部门的变动改变了实际现金余额的均衡值，这个均衡点也会移动。

Although real cash balances are certainly a factor of production they need not enter the consumption function.
虽然实际现金余额无疑是一个生产要素，但它们不一定进入消费函数。

Where the income from cash balances is partly imputed and enters into im-

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puted consumption, this need not affect the relation between consumption and income.

如果来自现金余额的收入部分是估算的并进入估算消费，这不一定会影响消费与收入之间的关系。

The consumption imputed from real cash balances will not in general be the fraction b of the total income produced by and imputed from them, but other consumption will bring the aggregate relationships into conformity with the consumption function.

从实际现金余额估算的消费通常不会是它们产生并估算的总收入的 b 份额，但其他消费将使总量关系与消费函数保持一致。

3.5 CONSUMPTION AND THE RATE OF INTEREST
消费与利率

Although it is generally assumed that consumption depends in some way on the rate of interest, we have ignored its effect for the sake of simplicity.

虽然通常假设消费以某种方式取决于利率，但为了简单起见，我们忽略了它的影响。

To correct the omission, we write a revised consumption function

为了纠正这一遗漏，我们写出一个修正后的消费函数：

$$C = a + b_1 y + b_2 i \tag{31}$$

where b_2 is a constant. The expenditure sector function then becomes

其中 b_2 是一个常数。支出部门函数随即变为：

$$y = \frac{a + g_0 + g_1 i + b_2 i}{1 - b} \tag{32}$$

As the rate of interest appears in the investment function, and was therefore already present in the expenditure sector function, the new form (32) of this function is still an equation in two variables, a single curve.

由于利率出现在投资函数中，因此已经存在于支出部门函数中，所以该函数的新形式 (32) 仍然是一个包含两个变量的方程，即一条单一曲线。

(With a real balance effect it would be an equation in three variables, as before.)

（如果存在实际余额效应，它将如前所述是一个包含三个变量的方程。）

The slope of the curve, referred to the interest-rate axis, is now the product of the multiplier times the sum of the change in investment and the change in consumption induced by the interest rate.

该曲线相对于利率轴的斜率，现在是乘数与由利率引起的投资变化和消费变化之和的乘积。

3.6 REAL INCOME IN THE INVESTMENT FUNCTION
投资函数中的实际收入

In the discussion of the investment function in Chapter 2, the shape and position of this function came from business investment opportunities, with business expectations taken as fixed.

在第 2 章关于投资函数的讨论中，该函数的形状和位置来自商业投资机会，并假设商业预期是固定的。

While business expectations are notoriously unpredictable, they seem to depend in part on the way things are actually going, for example, on the level of current real income.

虽然商业预期众所周知地不可预测，但它们似乎部分取决于实际情况的发展，例如当前的实际收入水平。

One way to allow for this possibility is to include real income as a variable in the investment function:

考虑到这种可能性的一种方法是将实际收入作为一个变量包含在投资函数中：

$$z = g_0 + g_1 i + g_2 y \tag{33}$$

In this case the investment function becomes a family of curves, as shown in Figure 38, the higher curves corresponding to higher real income.

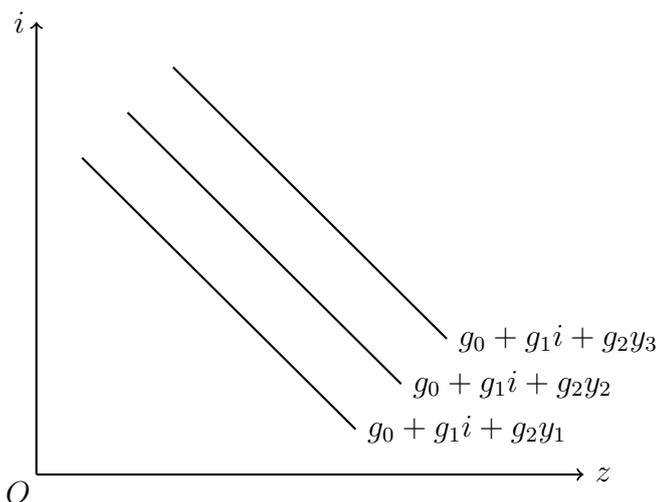在这种情况下，投资函数变成了一族曲线，如图 38 所示，较高的曲线对应较高的实际收入。

Figure 38

A preferable way to present the function, however, with a view to combining it with the other functions of the expenditure sector, is shown in Figure 39; investment is plotted against income, holding the rate of interest constant along each curve.

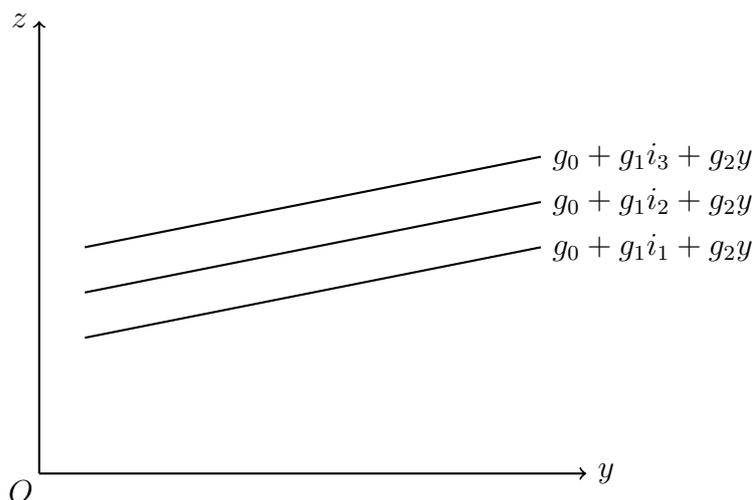然而，为了将其与支出部门的其他函数结合起来，展示该函数的一种更好的方式如图 39 所示；投资被绘制为收入的函数，沿每条曲线保持利率不变。

$$z$$

$$g_0 + g_1 i_3 + g_2 y$$
$$g_0 + g_1 i_2 + g_2 y$$
$$g_0 + g_1 i_1 + g_2 y$$

$$y$$

$$O$$

Figure 39

Viewed in this way, the investment function is fully analogous to the consumption function.
以这种方式看待，投资函数与消费函数完全类似。

So also is the sum of the consumption function and the investment function, total desired expenditure.
消费函数与投资函数之和，即总意愿支出，也是如此。

This curve is shown in Figure 40, cutting the $45°$ line at the point A.
这条曲线如图 40 所示，在 A 点切割 45° 线。

Note that it slopes up more steeply than the consumption function below it, because investment also increases with income.
请注意，它的向上倾斜度比其下方的消费函数更陡，因为投资也随着收入增加。

The two curves are shown for a single real rate of interest i_1; for a different rate of interest, the intersection point will be different.
这两条曲线是针对单一实际利率 i_1 展示的；对于不同的利率，交点将会有所不同。

In this respect, the analytical properties of the system are the same as before; the single equation condensed from the functions of the expenditure sector is one equation in two variables and can be represented as a single curve.
在这方面，系统的分析性质与以前相同；从支出部门函数浓缩而成的单个方程是一个包含两个变量的方程，可以用一条曲线表示。

Proceeding as before, we have
像以前一样推导，我们得到：

$$y = \frac{a + g_0 + g_1 i + b_2 i}{1 - b_1 - g_2} \tag{34}$$

There is one respect, however, in which (34) differs markedly from all earlier
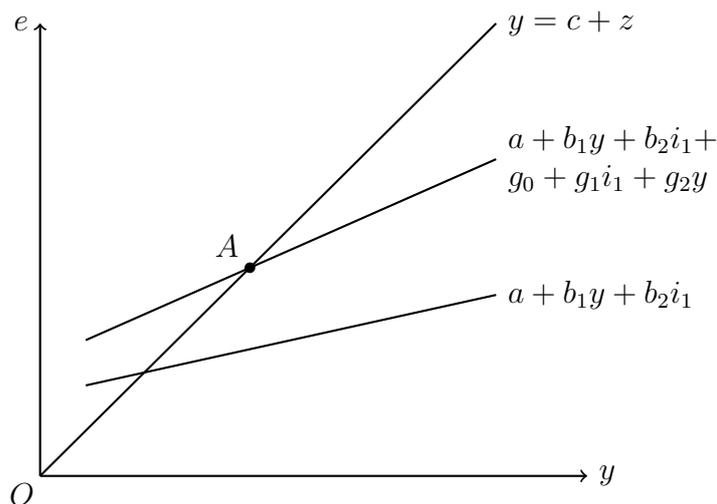
Figure 40

versions of the expenditure sector curve.
然而，在某一方面，方程 (34) 与支出部门曲线的所有早期版本显著不同。

Previously the expenditure sector curve necessarily had a negative slope, because $g_1 < 0$ and $b_1 < 1$.
以前，支出部门曲线必然具有负斜率，因为 $g_1 < 0$ 且 $b_1 < 1$。

In contrast, the slope of (34) can be positive, zero, or negative. Its shift characteristics can also vary in the same way.
相比之下，(34) 的斜率可以是正的、零或负的。其移动特征也可以以同样的方式变化。

The key to the properties of the sector is the multiplier.
该部门属性的关键在于乘数。

Consider the effect of a shift in either the consumption or the investment function.
考虑消费函数或投资函数移动的影响。

Denote the size of the shift for given real income and interest rate by Δx, and note that the effect of a change in real income on real investment (the slope of the relevant curve in Figure 39) is g_2.
用 Δx 表示在给定实际收入和利率下的移动幅度，并注意实际收入变化对实际投资的影响（图 39 中相关曲线的斜率）是 g_2。

Taking the difference between the new and old equilibrium values satisfying equation (34), we have
取满足方程 (34) 的新旧均衡值之差，我们有：

$$\Delta y = \frac{\Delta x}{1 - b_1 - g_2} = k' \Delta x \tag{35}$$

If we define a marginal propensity to spend $s = b_1 + g_2$, the amount of new

spending on both consumption and investment induced by a dollar increase in income, we have

如果我们定义边际支出倾向 $s = b_1 + g_2$，即收入增加一美元所引致的消费和投资的新支出总量，我们有：

$$k' = \frac{1}{1-s} \tag{36}$$

which, formally speaking, is analogous to k.

形式上讲，这类似于 k。

Its analogy to k also extends to the characteristics of the expenditure sector curve (34), whose slope is equal to the product of k' times the additional expenditure—consumption plus investment—directly induced by the rate of interest.

它与 k 的类比也延伸到了支出部门曲线 (34) 的特征，该曲线的斜率等于 k' 乘以由利率直接引致的额外支出（消费加投资）。

However, the assurance that $b < 1$ does not assure $s < 1$.

然而，$b < 1$ 的保证并不能保证 $s < 1$。

It can be seen in equation (35) that if the marginal propensity to invest g_2 is greater than the marginal propensity to save $1 - b$, then k' is negative.

从方程 (35) 可以看出，如果边际投资倾向 g_2 大于边际储蓄倾向 $1 - b$，那么 k' 就是负的。

No principle of economic behavior assures that this cannot happen.

没有任何经济行为原则能保证这不会发生。

If it does happen, the expenditure sector curve will slope upward rather than downward and will shift in the opposite direction to a shift of any of the functions in the expenditure sector.

如果这种情况发生，支出部门曲线将向上倾斜而不是向下倾斜，并且其移动方向将与支出部门中任何函数的移动方向相反。

A negative multiplier presents special problems of interpretation.

负乘数带来了特殊的解释问题。

If we attempt to derive it in terms of a spending-responding sequence of the type introduced in Chapter 2, section 3, we get an entirely different result.

如果我们试图用第 2 章第 3 节介绍的那种支出-再支出序列来推导它，我们会得到一个完全不同的结果。

Proceeding as in that section, we have an ultimate change in income Δy, resulting from a shift in expenditure Δx, equal to

按照那一节的方法继续推导，我们得到由支出变动 Δx 引起的最终收入变动 Δy 等于：

$$\Delta y = \Delta x(1 + s + s^2 + s^3 + s^4 + \cdots) \tag{37}$$

If $s > 1$, however, the expression in parentheses does not converge to any finite number but rises without limit as additional powers of s are included.
然而，如果 $s > 1$，括号中的表达式不会收敛于任何有限数值，而是随着 s 的额外幂次被包含进来而无限增加。

Each round of increased spending in turn provokes a still larger increase, and so on without limit.
每一轮增加的支出反过来又激起更大的增加，如此无限循环。

Looked at in this way, the multiplier is positive and infinite, not negative.
从这个角度看，乘数是正无穷大，而不是负的。

However, the derivation in equations (35) and (36) is a valid case of comparative statics, as is the use of the expenditure sector curve (34) in a model complete with all three sectors, regardless of whether k' as defined in equation (36) is positive, negative, or infinite.
然而，方程 (35) 和 (36) 中的推导是比较静态分析的一个有效案例，在包含所有三个部门的完整模型中使用支出部门曲线 (34) 也是如此，无论方程 (36) 中定义的 k' 是正的、负的还是无穷大。

The arguments concerning the direction and mechanism of pressure on the price level, and its presumptive tendency to restore overall equilibrium, still apply.
关于价格水平压力的方向和机制，以及其恢复全面均衡的推定趋势的论点仍然适用。

If the expenditure sector curve slopes upward, we can say that the tendency for desired real expenditures to exceed full-employment real income, when the price level is too low, appears to be boundless.
如果支出部门曲线向上倾斜，我们可以说，当价格水平过低时，意愿实际支出超过充分就业实际收入的趋势似乎是无限的。

This boundless tendency might mean that equilibrium, if attained, is unstable; it depends on our assumptions about dynamic adjustments.
这种无限的趋势可能意味着均衡（如果达到的话）是不稳定的；这取决于我们要关于动态调整的假设。

Most dynamic models use the sequence approach, which here gives an infinite multiplier when $s > 1$; such a case may nevertheless be tractable if some barrier, such as full employment, modifies the multiplier process after a certain point.[1]
大多数动态模型使用序列方法，当 $s > 1$ 时，这在此处给出了一个无限乘数；然而，如果某种障碍（如充分就业）在某一点后修正了乘数过程，这种情况可能仍然是可处理的。[1]

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[1]Extensive treatment of cases of this kind appears in J. R. Hicks, *A Contribution to the Theory of the Trade Cycle* (New York, Oxford, Clarendon Press, 1950).

[1]对此类情况的广泛处理参见 J. R. Hicks, *A Contribution to the Theory of the Trade Cycle* (New York, Oxford, Clarendon Press, 1950)。

3.7 THE REAL WAGE RATE IN THE INVESTMENT FUNCTION
投资函数中的实际工资率

A variable not yet considered that almost certainly affects investment is the real wage rate.
一个尚未考虑但几乎肯定会影响投资的变量是实际工资率。

The rate of profit a business firm can expect on a given investment opportunity will depend on the costs of the resources that will cooperate with the new capital, and the most important of these costs is the cost of labor.
企业对给定投资机会所能预期的利润率将取决于与新资本配合的资源成本，而这些成本中最重要的是劳动力成本。

The higher the real wage rate, the less profitable the opportunity will be, at a given rate of interest.
在给定利率下，实际工资率越高，机会的利润就越低。

It follows that when any shift changes the equilibrium real wage rate, the investment function will be shifted.
由此可见，当任何变动改变均衡实际工资率时，投资函数都会发生移动。

This approach is an alternative to using real income as a variable in this function.
这种方法是将实际收入作为该函数变量的一种替代方案。

We have
我们有：

$$z = g_0 + g_1 i + g_2 w \tag{38}$$

Accordingly, even if real cash balances are not a variable in the consumption function, the expenditure sector function is a family of curves rather than a single curve, depending on the real wage rate.
因此，即使实际现金余额不是消费函数中的变量，支出部门函数也是一族曲线，而不是单一曲线，这取决于实际工资率。

Now consider again the effects of a shift in the production function, analyzed in the last section of Chapter 2.
现在再次考虑第 2 章最后一节分析的生产函数移动的影响。

There it was assumed that the shift was such as to leave the investment schedule unchanged.
那里假设这种移动保持投资计划不变。

Here we shall consider a more general kind of shift.
在这里，我们将考虑一种更一般的移动。

Ordinarily an upward shift in the production function will improve investment opportunities and will increase real wages.
通常，生产函数的向上移动将改善投资机会并增加实际工资。

Other outcomes are possible but unlikely.
其他结果也是可能的，但不太可能。

The shifts in the production-employment sector appear in Figure 41(a) and (b).
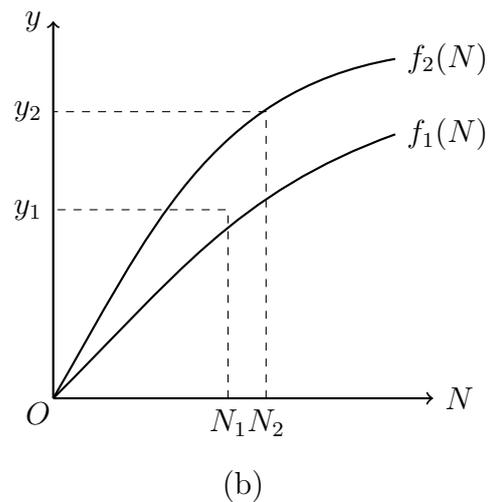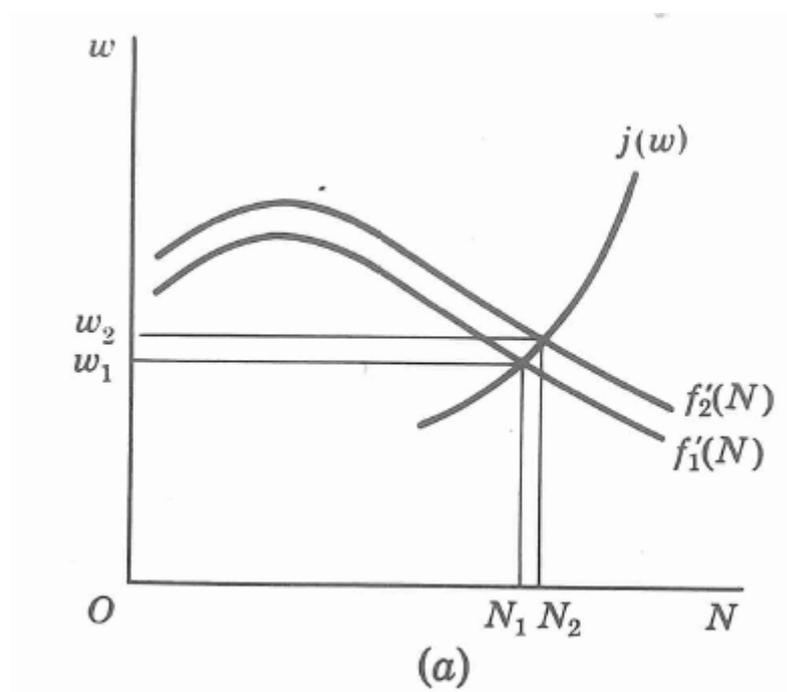生产-就业部门的移动如图 41(a) 和 (b) 所示。

(b)

Figure 41

(a)

Both the marginal-productivity schedule, in (a), and the production function, in (b), appear with an upward shift throughout.
无论是 (a) 中的边际生产力表，还是 (b) 中的生产函数，都显示出整体向上的移动。

In this example equilibrium employment increases from N_1 to N_2, the equilibrium real wage rate from w_1 to w_2, and equilibrium real income y_1 to y_2.
在这个例子中，均衡就业从 N_1 增加到 N_2，均衡实际工资率从 w_1 增加到 w_2，均衡实际收入从 y_1 增加到 y_2。

The investment function is now subject to two opposite directions of shift: the shift in the production function tends to increase investment opportunities at a given real wage, real income, and rate of interest; but the rise in the real wage tends to reduce real investment, as just indicated.
投资函数现在受到两个相反方向移动的影响：生产函数的移动倾向于在给定的实际工资、实际收入和利率下增加投资机会；但正如刚才指出的，实际工资的上升倾向于减少实际投资。

Ordinarily one would expect that the upward shift in the production function will dominate, because technological advance usually does seem to result in substantial new investment, which precedes and helps drive up income and wages.
通常人们会预期生产函数的向上移动将占主导地位，因为技术进步通常确实会导致大量的新投资，这些投资先于并有助于推高收入和工资。

Accordingly, in Figure 42 the expenditure function shifts to the right.
因此，在图 42 中，支出函数向右移动。

A smaller shift to the right is shown for full-employment real income, again a plausible but not certain outcome; in this case the equilibrium of the non-monetary sectors is moved from the point A to the point B, at which the equilibrium rate of interest is higher than before.
充分就业实际收入显示出较小的右移，这同样是一个合理但不确定的结果；在这种情况下，非货币部门的均衡从 A 点移动到 B 点，此时的均衡利率高于以前。
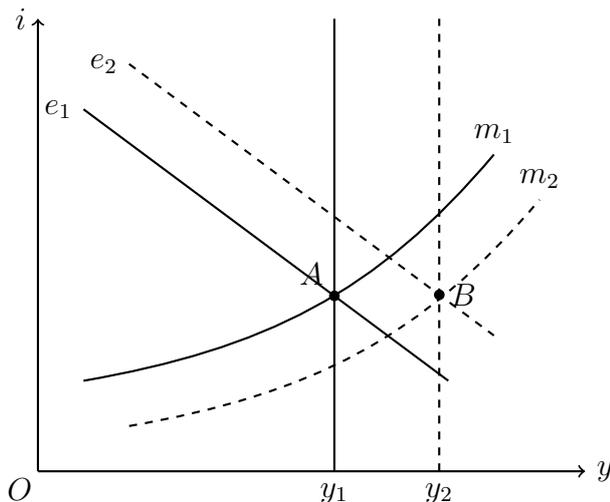

Figure 42

As the point B is below the old monetary sector curve, a fall in the price level is required to achieve overall equilibrium, though not so great a fall as was implied in the example at the end of Chapter 2.

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由于 B 点位于旧的货币部门曲线下方，需要价格水平下降才能实现全面均衡，尽管下降幅度没有第 2 章末尾例子中所暗示的那么大。

If investment takes time to increase potential full-employment real income, the effect at first is merely that of an upward shift in the investment schedule, which drives up the rate of interest without increasing equilibrium income.
如果投资需要时间来增加潜在的充分就业实际收入，起初的效果仅仅是投资计划的向上移动，这会推高利率而不增加均衡收入。

The direction of change for every variable is in fact uncertain, although probable directions can be indicated for most of them.
事实上，每个变量的变化方向都是不确定的，尽管可以指出其中大多数变量的可能方向。

Real income will almost certainly rise when the production function shifts upward, although a sharply backward-bending supply of labor could conceivably reduce it.
当生产函数向上移动时，实际收入几乎肯定会上升，尽管急剧向后弯曲的劳动力供给可能会想象地减少它。

The other variables also have probable but uncertain directions of change.
其他变量也有可能但不确定的变化方向。

The real wage rate, real investment, the interest rate, the nominal quantity of money, and consumption will probably, but not necessarily, rise.
实际工资率、实际投资、利率、名义货币数量和消费可能会上升，但不一定。

The price level may either rise or fall: we expect it to rise at first when the upward shift of investment dominates the picture, but we expect that the new production methods brought in with this investment will lower the prices of the affected goods and services.
价格水平可能上升也可能下降：当投资的向上移动主导局面时，我们预期它起初会上升，但我们预期随这项投资引入的新生产方法将降低受影响商品和服务的价格。

When their prices fall and their output increases, the general price level will fall, possibly below its old level.
当它们的价格下降且产量增加时，一般价格水平将下降，可能低于旧水平。

These remarks suggest a two-stage shift.
这些评论暗示了一个两阶段的移动。

First, the investment schedule shifts upward without any change in full-employment real income.
首先，投资计划向上移动，而充分就业实际收入没有任何变化。

This shift appears in Figure 43(a), which is the same as Figure 28 of Chapter 2.
这种移动出现在图 43(a) 中，这与第 2 章的图 28 相同。

As noted there, the interest rate and the price level rise, while nothing else

changes in the real sectors (although if consumption and investment both depend on the interest rate the mix of the two at the same full-employment real income will change).

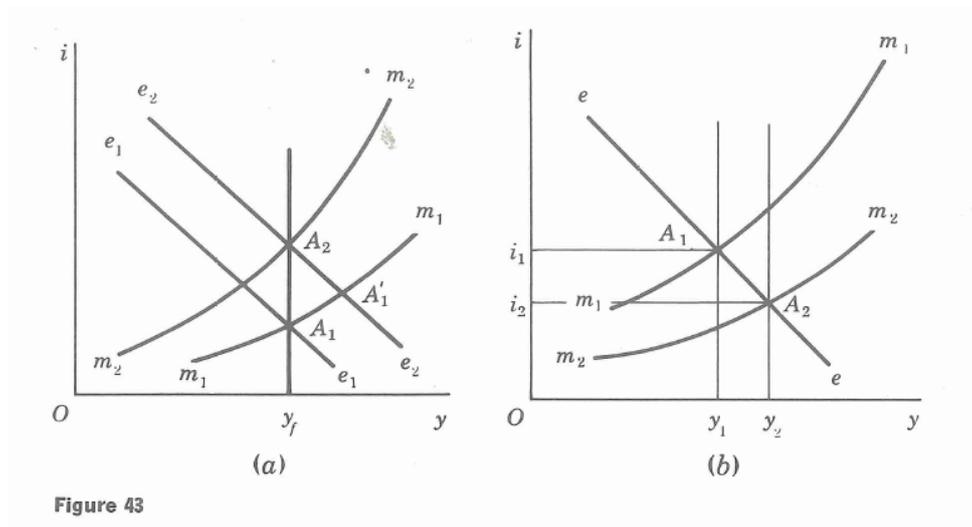正如那里指出的，利率和价格水平上升，而实际部门中没有其他变化（尽管如果消费和投资都取决于利率，在相同的充分就业实际收入下，两者的组合将会改变）。

Figure 43

Then when full-employment real income increases, we have the shifts shown in Figure 43(b), which is the same as Figure 31 of Chapter 2.

然后，当充分就业实际收入增加时，我们得到图 43(b) 所示的移动，这与第 2 章的图 31 相同。

Now the price level and the interest rate fall, while consumption, investment, and real income all increase, as noted there.

正如那里指出的，现在价格水平和利率下降，而消费、投资和实际收入都增加。

Figure 42 is a possible result of combining the two halves of Figure 43.

图 42 是图 43 两部分结合的一个可能结果。

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APPENDIX

MATHEMATICAL APPENDIX TO CHAPTER 3

We begin with the same equations of the three sectors as we had in Chapter 2.
我们从与第 2 章相同的三个部门的方程开始。

$$y = \frac{a + g_0 + g_1 i}{1 - b} \tag{21}$$

$$\frac{h(i)}{P} = L(i, y) \tag{22}$$

$$y = f(N_f) = y_f \tag{26}$$

Now if the wage level is arbitrarily increased above the full-employment real wage, where we ignore the supply curve of labor $j(w)$, we have
现在，如果工资水平被任意提高到充分就业实际工资之上，在这里我们忽略劳动力供给曲线 $j(w)$，我们有：

$$\delta w = \delta\left(\frac{W}{P}\right) > 0 \quad \delta w = f'' \delta N \quad \text{or} \quad \delta N = \frac{\delta w}{f''} < 0$$

because in equilibrium $f'' < 0$. Then
因为在均衡状态下 $f'' < 0$。那么：

$$\delta y = f' \delta N = \frac{f'}{f''} \delta w < 0 \tag{A-1}$$